

# Coal Age

JANUARY, 1953

A MCGRAW-HILL PUBLICATION — PRICE 50¢

## Combining Deep, Strip And Auger Mining

How Compass Coal uses  
all three for high-efficiency  
output of 7,400 tpd. p 84

## Bolting Beats Bad Top

Application holds worst  
roof in West Virginia after  
steel timbers failed. p 94

Full Contents on p 5

### Summary

Face-long bars - big drills -  
bolting - less downtime

.30  
~~.35~~

Higher yield plus 2"

.10

Haulage - two crews less

.15

Power - water - ventilation

—

Maintenance

?

Supplies - less loss - better handling

.15

10% more recovery in tipple

.05

Outside - other

?

Chargeoff - depreciation new eq.

~~.75~~

.10

.65

4.35  
~~.65~~

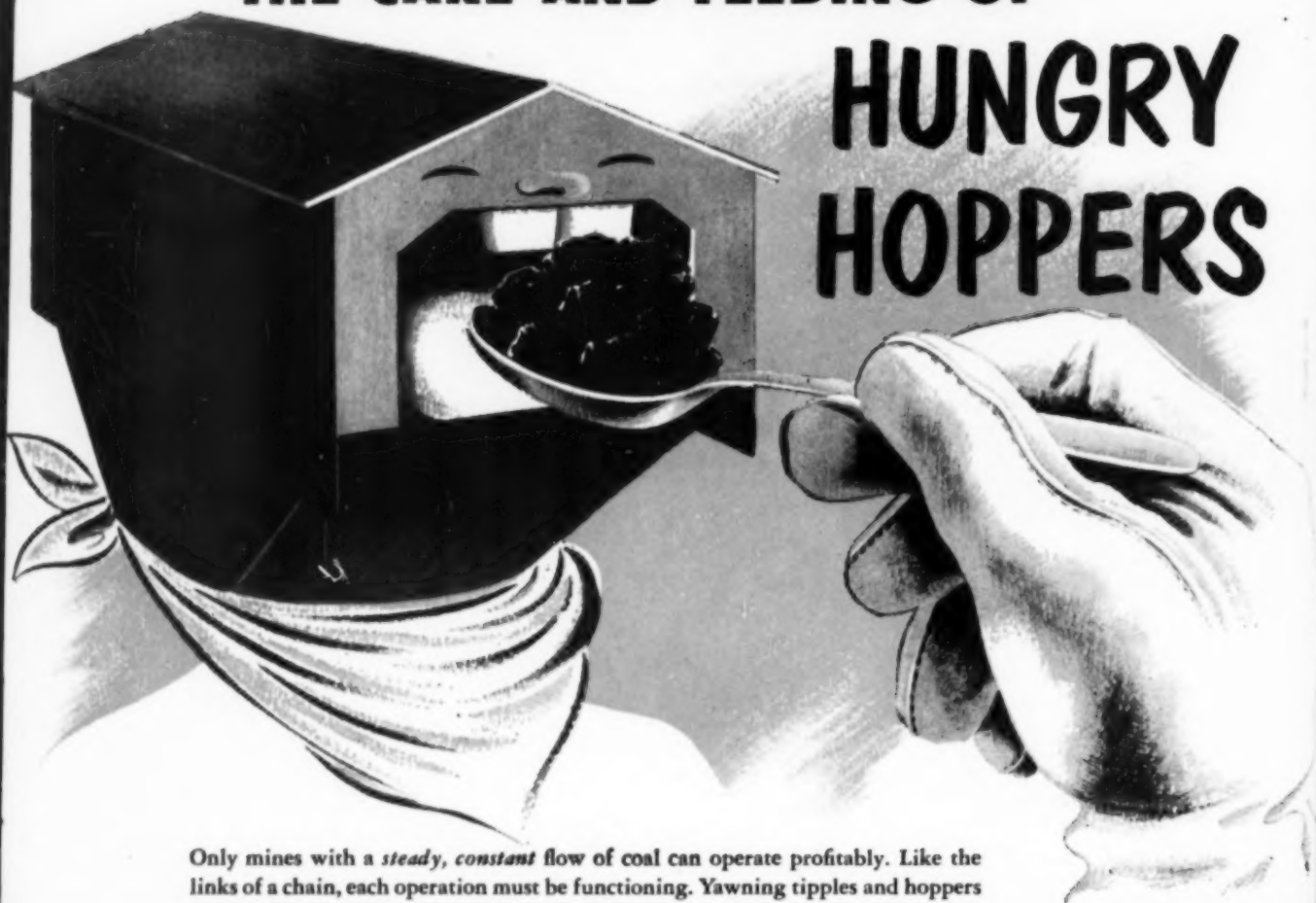
3.70 new cost ✓

COAL AGE SPECIAL REPORT

Cost Cutting Today . . . p 70

# THE CARE AND FEEDING OF

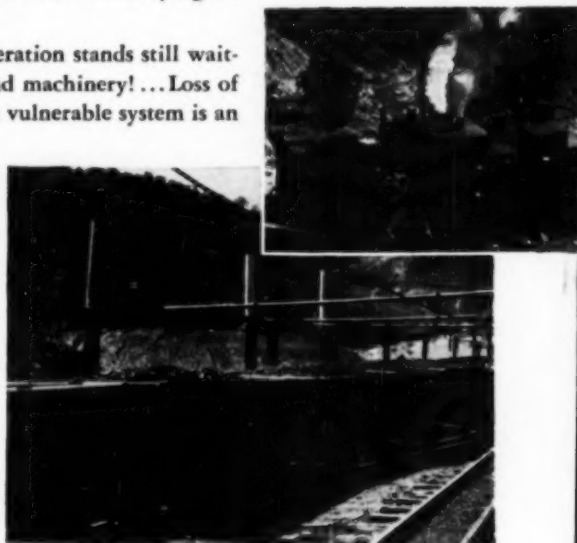
# HUNGRY HOPPERS



Only mines with a *steady, constant* flow of coal can operate profitably. Like the links of a chain, each operation must be functioning. Yawning tipples and hoppers must be filled to keep them satisfied. The preparation plant waits... relying on smooth, uninterrupted production all along the line.

But what about a haulage shutdown, when the whole operation stands still waiting for repairs to the transportation system? Idle men and machinery!... Loss of tons of coal that can never be made up! To employ such a vulnerable system is an expensive form of gambling—especially when you lose.

With 'Constant Haulage' Mine Cars, this can never happen, because, you see, when a mine car needs repairs, the rest of the trip continues on — piling-up tonnage. And remember, with mine cars, men and supplies are hauled into the mine on the same transportation system that takes coal out. If you're planning a new mine, modernizing your present one—we urge you to investigate **A.C.F. Mine Cars**. American Car and Foundry Company, New York • Chicago • St. Louis • Cleveland • Washington • Philadelphia • San Francisco • Huntington, W. Va. • Berwick, Pa.



# a.c.f.

## MINE CARS

*for Constant Haulage*



RESEARCH KEEPS

**B.F. Goodrich**

FIRST IN RUBBER



## Where coal rides a roller coaster

### *B. F. Goodrich beltroad cuts conveying costs per ton*

**M**ANY coal mines are located up in the mountains, miles from low-cost transportation. In this case, three mountains stand between the mine and the river. But the four pictures above show how B. F. Goodrich engineers helped solve the problem.

A series of nine conveyor belts was designed to carry 350 tons of coal per hour down the first mountain (1), snake it across country around another mountain (2), shoot it through a mile-long tunnel in the third mountain (3), to the point where it finally emerges at the river's edge (4)—a roller coaster ride more than 2½ miles long.

In choosing the belts, B. F. Goodrich engineers knew the ordinary type could not handle the entire job because of the heavy impact when the coal and

rock are dumped onto the belt at the top of the slope. The belt recommended for this tough work was the B. F. Goodrich *cord* belt, so-called because it's reinforced with individual cords which run lengthwise. Each cord is completely surrounded by rubber. No cross threads tie them together—so they are free to give as heavy chunks of coal strike the belt. The rubber takes the shock.

B. F. Goodrich developed this cord belt years ago, and has since made many improvements that make it first choice for many really tough jobs. One such improvement is "balanced construction". Now the layers of individual cords are built into *both* the top and bottom of the belt to give even greater impact resistance. Other con-

struction features provide for proper troughing whether belt is empty, lightly or fully loaded, and permit longer centers, higher lifts to be used.

No matter what type or size of material you have to move, there's a B. F. Goodrich conveyor belt that can do it better, for less. Your local BFG distributor can show you how these longer-lasting belts can save you money, or write *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.* (Available in Canada)

*Conveyor Belts* BY  
**B.F. Goodrich**  
RUBBER FOR INDUSTRY

# *Specialized skill . . .*

Once thought visionary, space travel is a future certainty . . . every development of atomic power is a step toward solving the principle problem of propulsion.



**. . . WILL SOLVE TOMORROW'S PROBLEMS**

*..just as it does Today in Coal Mining Machinery*



# **Hulburt Quality GREASE**

Tomorrow in Coal Mining will take care of itself nicely, when you take the right step toward solving today's problem of the proper lubrication of Coal Mining machinery. That's a step to HULBURT — the use of Hulburt Quality

Grease with the cooperation of Hulburt Lubrication Engineers. When you use Hulburt Grease your coal mining machinery will take up less space in the repair shop, and travel more profitably down in the coal mine.

**HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.**

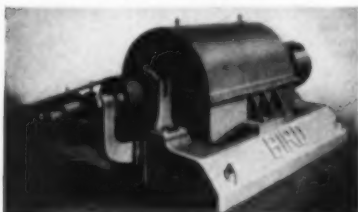
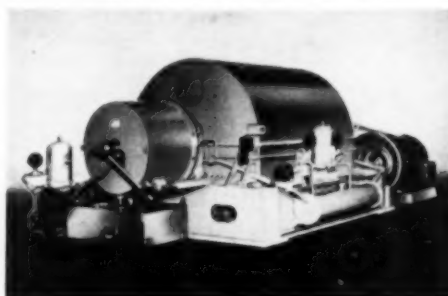
*Specialists in Coal Mine Lubrication*



**THE BIRD COAL FILTER'S** rated capacity is a ton a minute and this is being exceeded in many installations. Feed slurries may contain as little as 30 to 40% coal,  $\frac{1}{4}$  x 0 with as much as 20% of the solids finer than 200 mesh.

Operating costs, including everything — power, labor, amortization and maintenance — average less than seven cents a ton. When you consider that you get maximum fine coal recovery and eliminate screens, sludge tanks and any

other auxiliary dewatering devices, you can readily appreciate the magnitude of the savings effected with Bird Filters.



*P. S.* Those irritating high ash, minus 325 slimes that are such a headache to handle are whisked out of flocced, settled underflow by BIRD POLISHERS. You can readily maintain a closed water circuit and rid yourself of pollution problems.

May we supply specific information on the Bird Coal Filter and the Bird Polisher as they apply to your preparation set-up?

**BIRD MACHINE COMPANY**

SOUTH WALPOLE • MASSACHUSETTS





# WHAT HAPPENED IN 1952? ... WHAT'S AHEAD FOR COAL IN 1953?

These are major topics in the coming February Review and Forecast issue of *Coal Age*. The roundup will include:

- Competition and markets.
- Labor and public relations.
- Tonnage records and forecast.
- New mining developments.
- New preparation developments.
- Trends in loader and cleaner sales.
- Safety progress and outlook.

Combining both special staff-written appraisals and the up-to-the-minute statistics compiled by USBM experts, *Coal Age's* look at the 1952-53 picture will be added to its regular reports on significant developments in deep mining, stripping, preparation and safety. Here are some examples:

How a hand-held hydraulic drill powered by pump on a semi-trailer pulled by shortwall truck cuts drilling cost, even with the greater number of holes required by air-breaking to increase realization at No. 2 mine of the Gay Coal & Coke Co.

New Red Jacket No. 17 preparation plant, specially planned to process coal from two contiguous seams, includes Baum-jig washer, special settling tank, flygates instead of mixing conveyor, line-treating of water, and a design eliminating all but five conveyors. Plans call for adding pre-drying and air-cleaning facilities.

Practical ways and means of handling acid water and preventing stream pollution have been worked out by the Pennsylvania Sanitary Water Board. For your guidance, *Coal Age* presents a summary of the recommendations, rounded out with illustrations showing how they can be applied on the job.

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# CLIP OFF BEARING MAINTENANCE COSTS...

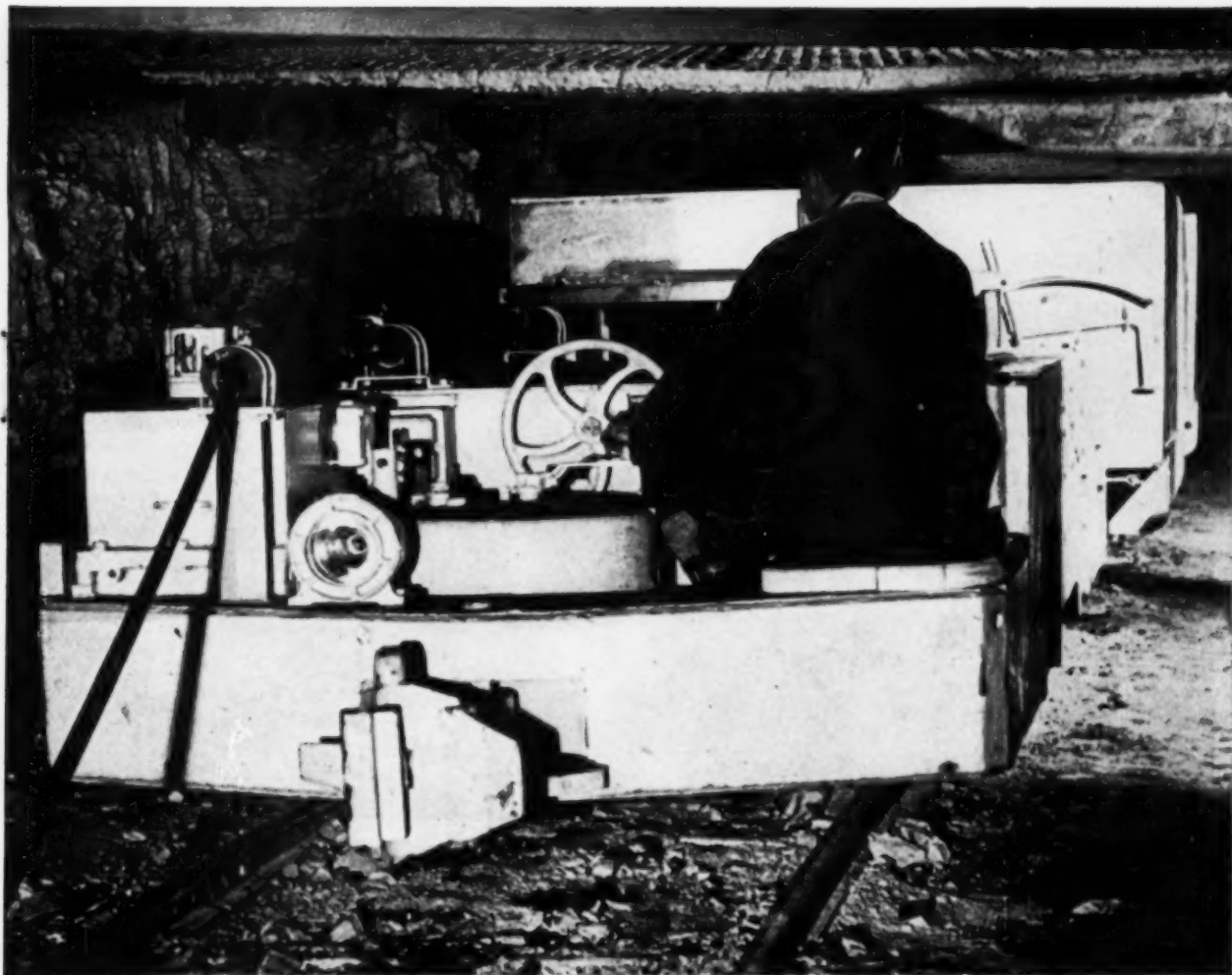
**by using TEXACO  
REGAL STARFAK**

If you took inventory, you'd find hundreds of grease-lubricated ball and roller bearings at work in your locomotives, cutters, loaders and other machines. These bearings are costly to replace, so it's poor economy to lubricate with anything but the best. Use premium-quality *Texaco Regal Starfak*. You'll assure much longer bearing life, much lower main-

TUNE IN . . . TEXACO  
STAR THEATER  
starring MILTON BERLE,  
on television  
Tuesday nights.  
METROPOLITAN OPERA  
radio broadcasts  
Saturday afternoons.



# TEXACO



tenance costs.

*Texaco Regal Starfak* is far out in front of ordinary grease in oxidation-resistance and ability to stand up under all high speed operating conditions. You'll find that *Texaco Regal Starfak* does not form gum, does not separate in service or in storage, does not leak out of bearings — gives longer lasting protection.

To protect wire rope and open gears, the lubricant to use is *Texaco Crater*. It keeps

your rope strong longer; assures smoother, quieter gear operation. If you prefer the convenience of liquid application, use *Texaco Crater X Fluid*.

Call in a Texaco Lubrication Engineer. Let him help you clip dollars off your maintenance costs. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

## LUBRICANTS for the Coal Mining Industry



## How Allis-Chalmers MOTOR SCRAPERS Help **Cut Cost per Yard**



**Positive, forced ejection . . .** eliminates wasteful circling or other time-consuming methods of removing the load. Allis-Chalmers' patented forced-ejection system plus high apron lift bulldozes dirt out of the bowl fast every trip . . . without extra wear and tear on power control unit cables and clutches.



**Easy operation.** From foam rubber seat to finger-tip control, shock-free hydraulic steering and full visibility, a TS-300 operator has every available help for safe, sure, speedy work. Balanced weight distribution and low center of gravity make A-C MOTOR SCRAPERS easy to maneuver even at top speed.





**Faster, easier loading . . .** because A-C MOTOR SCRAPERS have up to 20 hp. to handle every struck yard . . . plus offset cutting edges and "center-boiling" loading action that spills the dirt evenly, filling corner voids for full capacity loads.

**High-speed hauling.** The power behind the TS-300 teams up with big, traction-type tires that gear it to the road . . . move capacity loads at 22.5 mph. And operating clearance of 20 in. helps keep it from hanging up on rutted haul roads.

## by Cutting Time per Yard



**A dirt-moving "package"** that makes every second count. The powerful HD-20 torque converter tractor is an ideal teammate for the TS-300. It synchronizes to scraper speed at contact . . . automatically loads at fastest speed conditions permit with less strain on operator and equipment . . . gives scraper an extra fast start to the fill.

Your nearby A-C dealer will be glad to give you more yardage-boosting facts about job-tested, *job-proved* MOTOR SCRAPERS. He can also tell you where you can see them at work and talk to the men who own and operate them. You owe it to yourself to call or stop in soon.

TS-300 MOTOR SCRAPER	TS-200 MOTOR SCRAPER
14 cu. yd. struck capacity	10 cu. yd. struck capacity
18 cu. yd. heaped capacity	13 cu. yd. heaped capacity
280 hp. Buda diesel or	176 hp. Buda diesel or
275 hp. Cummins diesel	165 hp. Cummins diesel

**ALLIS-CHALMERS**  
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



THE FINEST LINE ON EARTH

# For Continuous Mining JEFFREY COLMOL and MOLVEYOR



151-51

## THEY WORK TOGETHER

The COLMOL is a continuous mining machine which advances into a solid seam removing all coal from an area 9½ feet wide, the full height of the seam. A Jeffrey MOLVEYOR is shown receiving coal from the COLMOL in the above photo. The MOLVEYOR is comprised of a receiving end section, a discharge end section and any number of 15-foot intermediate sections. It provides a flexible high productive means for transporting coal from the face to an entry conveyor. The MOLVEYOR advances with the COLMOL delivering continuously to entry belt conveyor.

Each section has a belt drive motor and a traction motor. Can be operated as complete unit up to 300 feet—or longer.

Tramming speed	33 feet per minute
Belt width	24 inches
Belt speed	300 or 400 feet per minute
Capacity	2½ or 3½ tons per minute

Consult a Jeffrey engineer relative to adaption of this unique system to your mine.



960-51

*For Continuous Flow of Coal  
Through Preparation*

## JEFFREY...FEEDERS... CRUSHERS...CONVEYORS



525-52

← 1

2 ↓

526-52

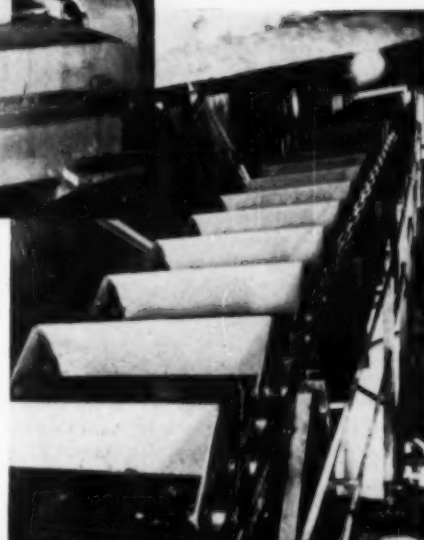
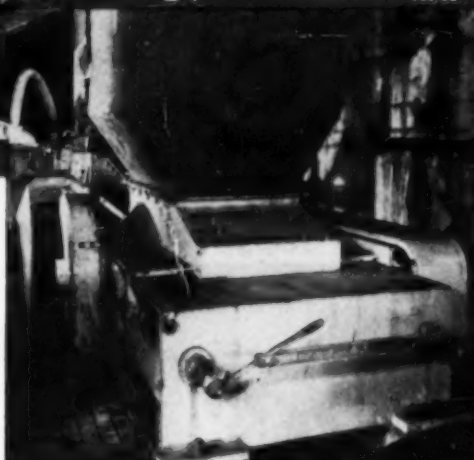
- 1 Jeffrey-Traylor Feeder for controlling feed from hopper to crusher.
- 2 30" x 36" Double Roll Crusher for reduction of coal to desired fineness.
- 3 Jeffrey Refuse Conveyor takes washing plant refuse to bin.

With the constantly increasing demand for high quality coal Jeffrey Preparation Plant equipment is performing important functions to produce better coal—to reduce cost of handling to a minimum. For example, the Jeffrey-Traylor electric vibrating Feeder (above) controls plant feed from hopper to crusher in a large preparation plant.

The Jeffrey 30" x 36" heavy duty Double Roll Crusher (right-above) takes feed from the vibrating Feeder. Proper design of toothed segments eliminates slabs, increases efficiency of cleaning plant, gives coal better appearance, and less fines. Refuse is crushed in sizes and shapes for most efficient separation.

The Refuse Conveyor (right) takes washing plant refuse to bin for truck disposal.

These units are typical of the modern equipment (including Baum and Diaphragm JIGS) engineered by Jeffrey for efficient, low-cost preparation. For maximum production of premium coal consult with a Jeffrey engineer.



3 ↑

527-52

# THE JEFFREY

**MANUFACTURING COMPANY** Established 1877

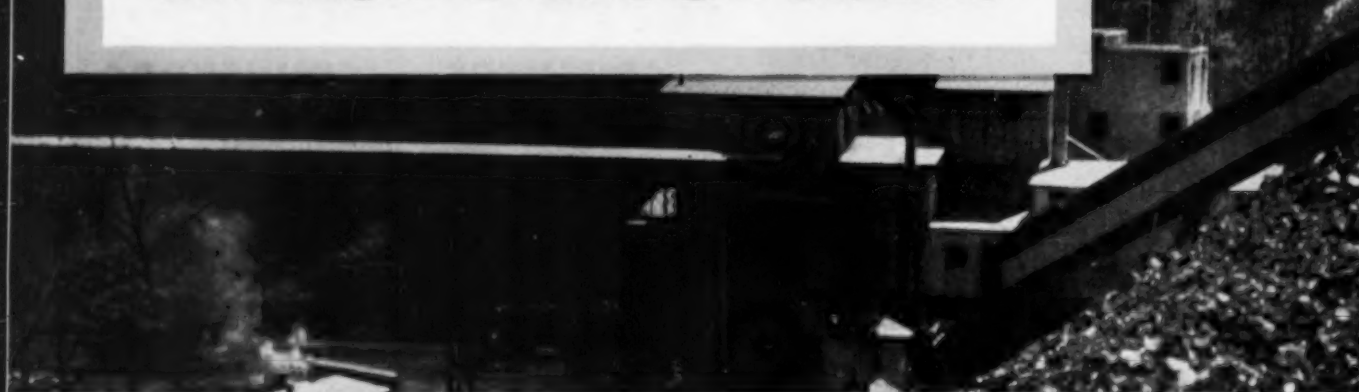
912 North Fourth St., Columbus 16, Ohio

Baltimore 2	Boston 16	Cincinnati 2	Detroit 13	Houston 2	New York 7	St. Louis 1
Buckley, W. Va.	Buffalo 2	Cleveland 15	Forty Fort, Pa.	Jacksonville 2	Philadelphia 3	Salt Lake City 1
Birmingham 3	Chicago 1	Denver 2	Harlan, Ky.	Milwaukee 2	Pittsburgh 22	
Jeffrey Mfg. Co. Ltd., Montreal, Canada			The Galien Iron Works & Mfg. Co., Galien and Bucyrus, Ohio			
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The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio						

A Complete  
Line of Mining,  
Material Handling  
and Processing  
Equipment



# 240 tons hourly at Red Parrot Mine



Tournarocker is chute-loaded with 15 tons of slate and bone coal in 18 seconds. Rig was driven to Prenter from Charleston (35 miles) under its own power.



Arriving at dump, Tournarocker backs to edge of bank. Big 4-wheel air brakes, plus front-wheel drive, give operator confidence for fast dumping, maneuvering.

## 1 "C" Tournarocker

Coal miners today are working many seams never before considered practical — thanks to new techniques in drift-mining and refuse-removal. Take the two Red Parrot Coal Company seams near Prenter, West Virginia, for example. Here's how they operate:

Red Parrot (division of North American Coal & Dock Corp., Cleveland, Ohio) removes coal from the mine in 2½-ton cars . . . dumps it into a "rope and button" conveyor running to the tippie and washer. Refuse — mostly slate and bone coal — is conveyed to an overhead bin several hundred feet above the plant. Then . . . to complete the company's time-saving, labor-saving mechanization . . . Red Parrot hauls refuse from bin to dump with a C Tournarocker. Production records show this *one* 18-ton Rear-Dump does the work of *three* 6 to 8-ton dump trucks on the refuse-removal operation.

## 16 loads per hr. on 3000' cycle

Working 2 shifts a day regardless of weather, Tournarocker is chute-loaded at the bin with

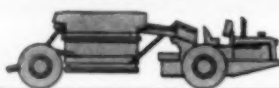
## INTERCHANGEABLE FOR EXTRA PROFITS

Same prime-mover is readily interchanged for use with scraper, bottom-dump, flat-bed, or crane. Assures year-round profits.

TOURNAPULL® SCRAPER  
7 to 42 yds.



BOTTOM-DUMP TOURNAHOPPER®  
18 and 27-yd.



MOBILE TOURNACRANE®  
10 to 40 tons







Tournarocker speeds from conveyor bin to dump in 3rd gear with full load of refuse. After 2,000 hours operation, owners report 98% mechanical efficiency.

## does work of 3 trucks

15 tons of slate and bone coal in an average of 18 seconds. It hauls 1500' to the dump in 1 minute 24 seconds... dumps in 6 seconds... and returns to the bin in 1 minute 20 seconds, for an average speed of 12.6 m.p.h. Rig completes the 3000' round trip in 3 minutes 6 seconds... makes 16 trips per 50-minute hour. Hourly production averages 240 tons. No wonder Outside Superintendent F. Mason Morgan says, "We are well pleased. Tournarocker works better than any rubber-tired equipment we've used." He adds, "Operator efficiency is up, too."

### Get facts for your work

Whenever you have rock, ore, or shovel-dirt to move, your best bet is Tournarocker. Available in sizes from 9 to 50 tons, 122 to 450 h.p. Constant-mesh transmission, torque converter, electric body heating unit, are optional. See your LeTourneau Distributor for factual job reports on work like yours. Let him arrange to show you rear-dump Tournarockers at work in your area.

**COAL STOCKPILING BOOK** shows how mobile LeTourneau units stockpile and compact coal without expensive fixed structures. It may be helpful to encourage your customers to stockpile more coal. If you'd like copies for your sales offices, drop us a line.



Rocker body tips to vertical, dumps instantly, clear over bank. Requires less clean-up, reduces cycle time. Rig's simple, sturdy design (no frame, no sub-frame, no springs, no hydraulics) saves on maintenance, too.

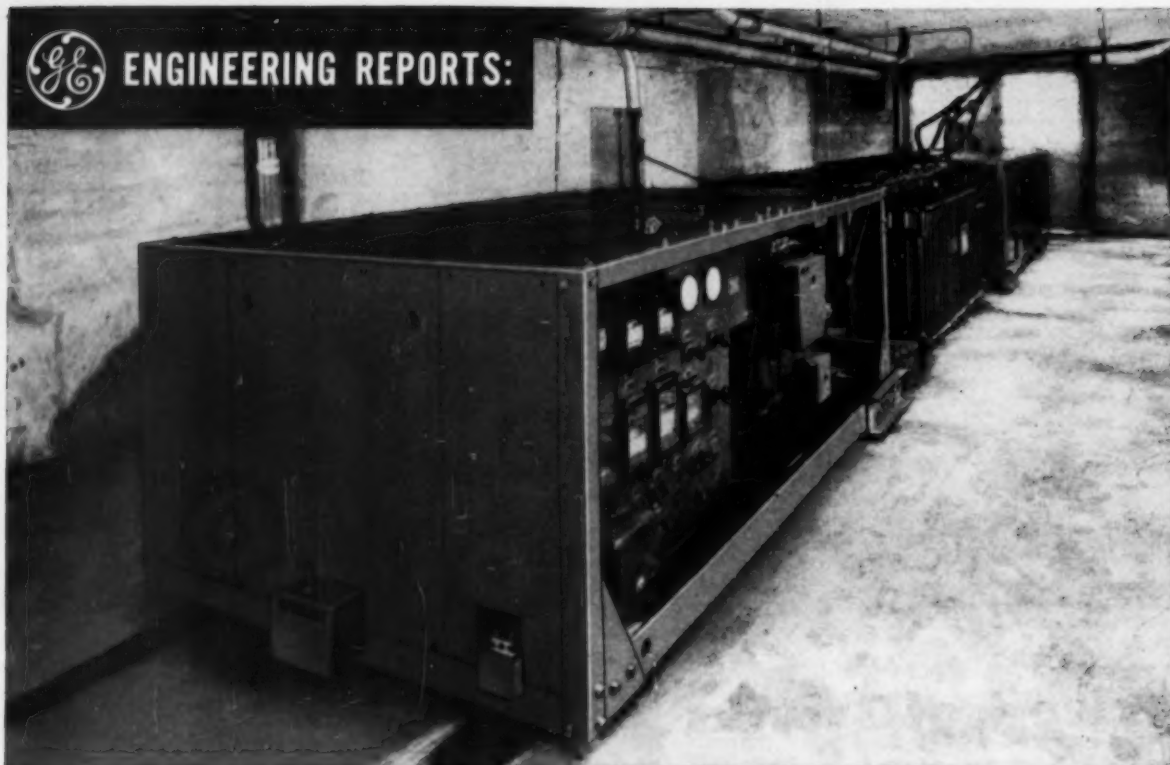
Tournarocker—Trademark Reg. U. S. Pat. Off. R-218-CM



**R. G. LeTOURNEAU, INC.**  
Peoria, Illinois



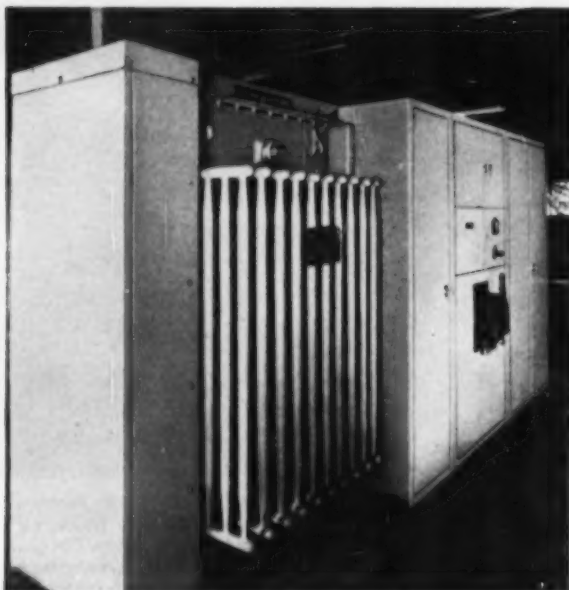
## ENGINEERING REPORTS:



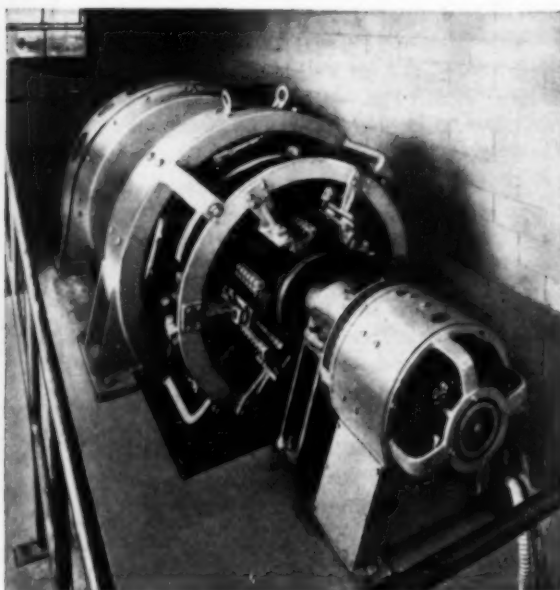
**FULL VOLTAGE AT THE FACE** is maintained at Crown Mine by this 300-kw G-E portable mining-type rectifier, to keep equip-

ment working at high efficiency. The fully integrated, automatic unit is enclosed to better protect personnel.

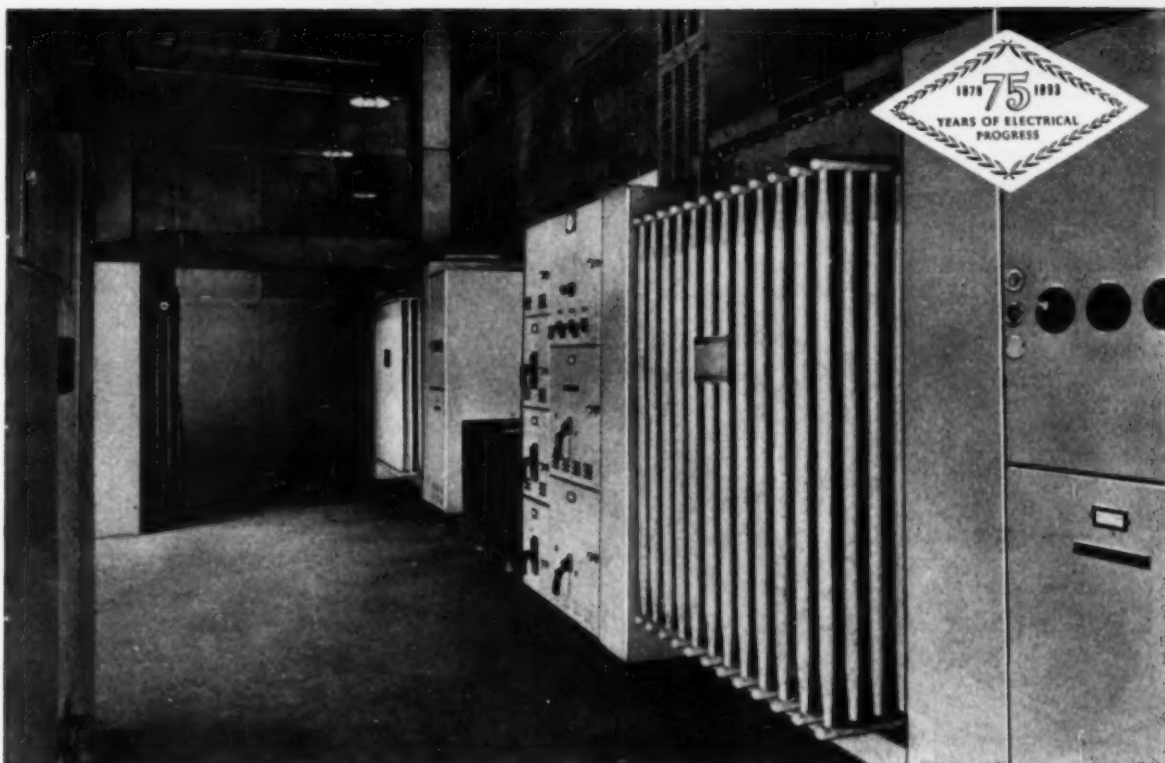
# Engineered power system is key



**STEP-DOWN TRANSFORMER** and control, through which voltage is reduced to suitable levels for operating Crown Mine's auxiliary hoist, was engineered to meet mine's specific needs.



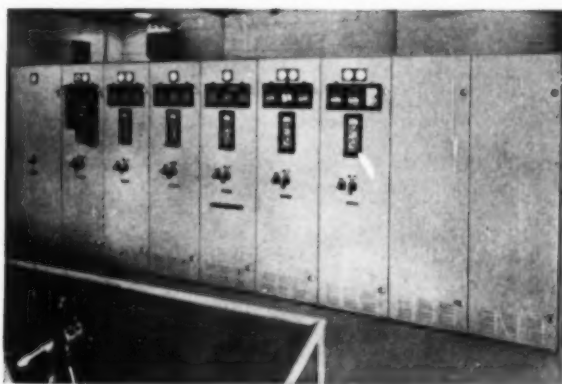
**SYNCHRONOUS MOTOR-GENERATOR SET**, rated 750 kw, supplies adjustable-voltage d-c power to motor driving the automatic main hoist. Set is controlled from plant's switchgear.



**LESS VOLTAGE DROP** takes place when plant voltage is stepped down close to points of use. These 4 G-E load-center unit

substations at Crown Mine (2 at left, 2 at right), reduce voltage from 4160 to 480 to feed plant motors.

## to Crown Mine's 800-tph output



**HIGH-VOLTAGE POWER** is distributed through this metal-clad switchgear lineup, where various mine and plant functions are sectionalized so that service interruptions are at a minimum.

**Co-ordinated G-E equipment provides high service continuity, minimizes shutdowns**

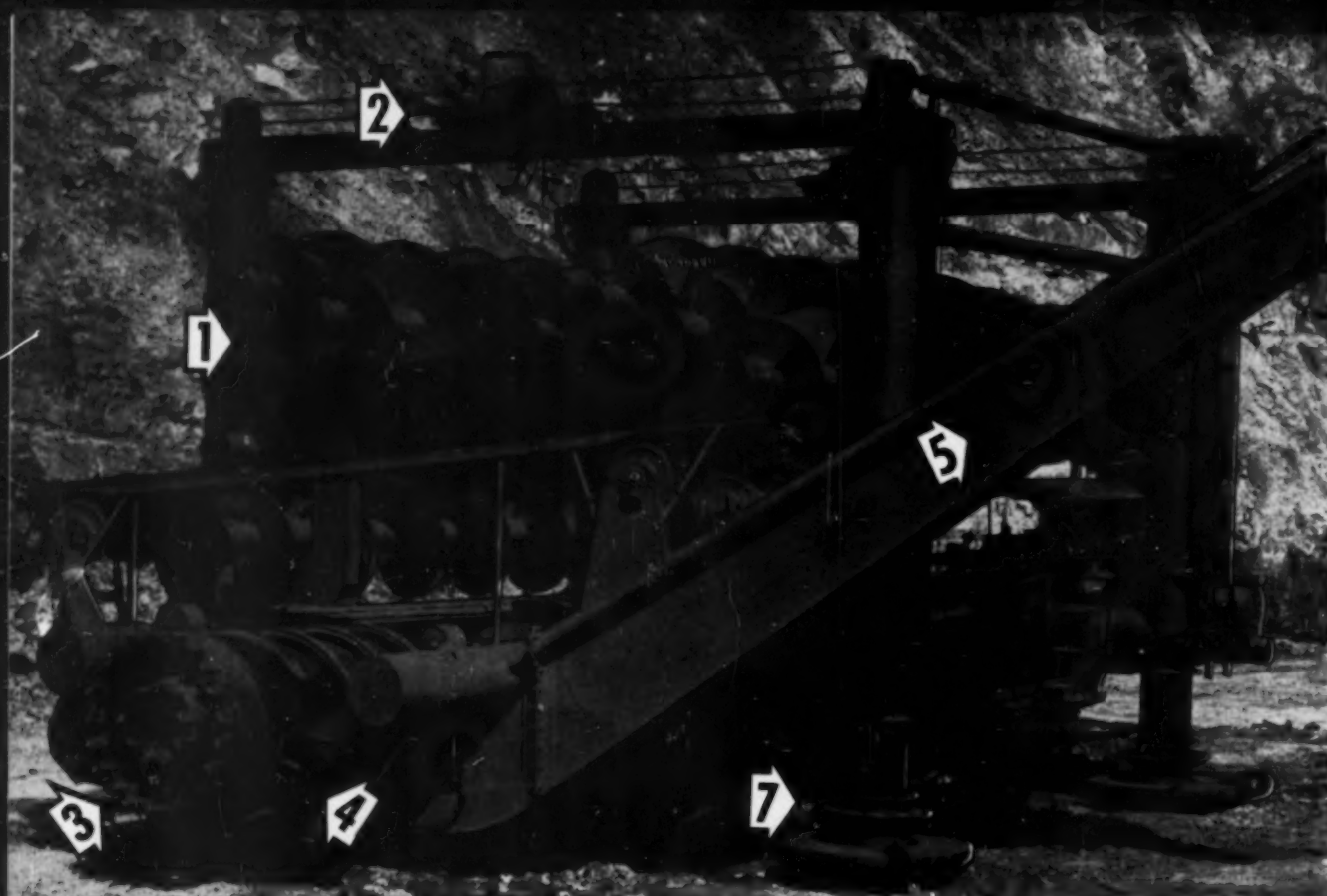
Modern is the word for Freeman Coal Mining Corporation's new Crown Mine at Farmersville, Illinois, with a rated capacity of 10,000 tons per day of coal. And modern is the word for its power distribution system, engineered and equipped by General Electric to assure high service continuity, integration of underground and surface operations, and consistently high output.

Just as G-E engineers utilized every applicable technique to co-ordinate Crown Mine's electric equipment into an efficient, low-cost system, they can do the same for your mine. To find out how, contact your local G-E Apparatus Sales Office—soon. General Electric Company, Schenectady 5, N. Y.

663-30

**Engineered Electrical Systems for Coal Mines**

**GENERAL**  **ELECTRIC**



# More Coal

## regardless of overburden...

*Recovers up to 700 tons  
per shift where overburden  
removal is too costly*

## COMPTON

When normal strip mining reaches an economical limit—where overburden removal is prohibitive—the Compton Auger paves the way to rapid high wall coal recovery at minimum cost. With proper planning, a practical 70% recovery is possible up to a depth of 200 feet from the high wall face.

Easily operated and low in maintenance cost, the Compton Auger is high in output... actual operations have proven up to 700 tons of clean, lumpy coal per normal shift with a maximum crew of 4 men.

The Compton Auger means increased production at lower cost... higher product quality through selective mining. Plan today to profitably extend your present operations or future developments with the use of Compton Augers.



## DESIGNED TO CUT OPERATION TIME!

The Compton Coal Auger is self-contained... no extra parts to be moved... no loose parts to be handled when the unit is ready to move and begin operation.

- 1 Auger sections conveniently racked at each side of the frame ready for transfer to operating position.
- 2 Hydraulically controlled, synchronized winches for handling auger sections.
- 3 Auger section can be placed in operating position in a matter of seconds.

- 4 Hydraulically operated pilot pan eliminates spillage between the machine and high wall.

- 5 Compton elevating conveyor is an integral part of the machine.

- 6 Hydraulically controlled, swivelling discharge turret chute assures uniform trimming of trucks.

- 7 Hydraulic jack legs with self-leveling pontoons that afford better floatation and allow drilling up to 200 ft. or more in depth without misalignment.

## SPECIFICATIONS

### Model 42

Length: 42 ft. Weight: Approx. 33 T. Carries nine 21 ft. auger sections. Required pit width: 45 ft. minimum. Power: 225 hp Diesel engine. Hydraulic frame jack lift: 66 inches. Auger Diameters: 48 inch to 30 inch. Possible drilling depth: 189 ft.

Hydraulic frame jack lift permits drilling of single holes or overlapping holes.

### Model 56

Length: 56 ft. Weight: Approx. 50 T. Carries six 34 ft. auger sections. Required pit width: 60 ft. minimum. Power: 300 hp Diesel engine. Hydraulic frame jacklift: 66 inches. Auger Diameters: 52 inch to 30 inch. Possible drilling depth: 204 ft.

# Self Contained Coal Auger



◀ In actual operation, the location of hydraulically-operated turret chute provides two-way loading approach for trucks. Truck maneuvering time is minimized... trucks are trimmed to full load without spillage.

NOW—Latest Development in Auger Cutting Heads—A non-clogging head with built-in spider bearing assembly! This new cutter head increases production by drilling straighter holes with less frictional drag.



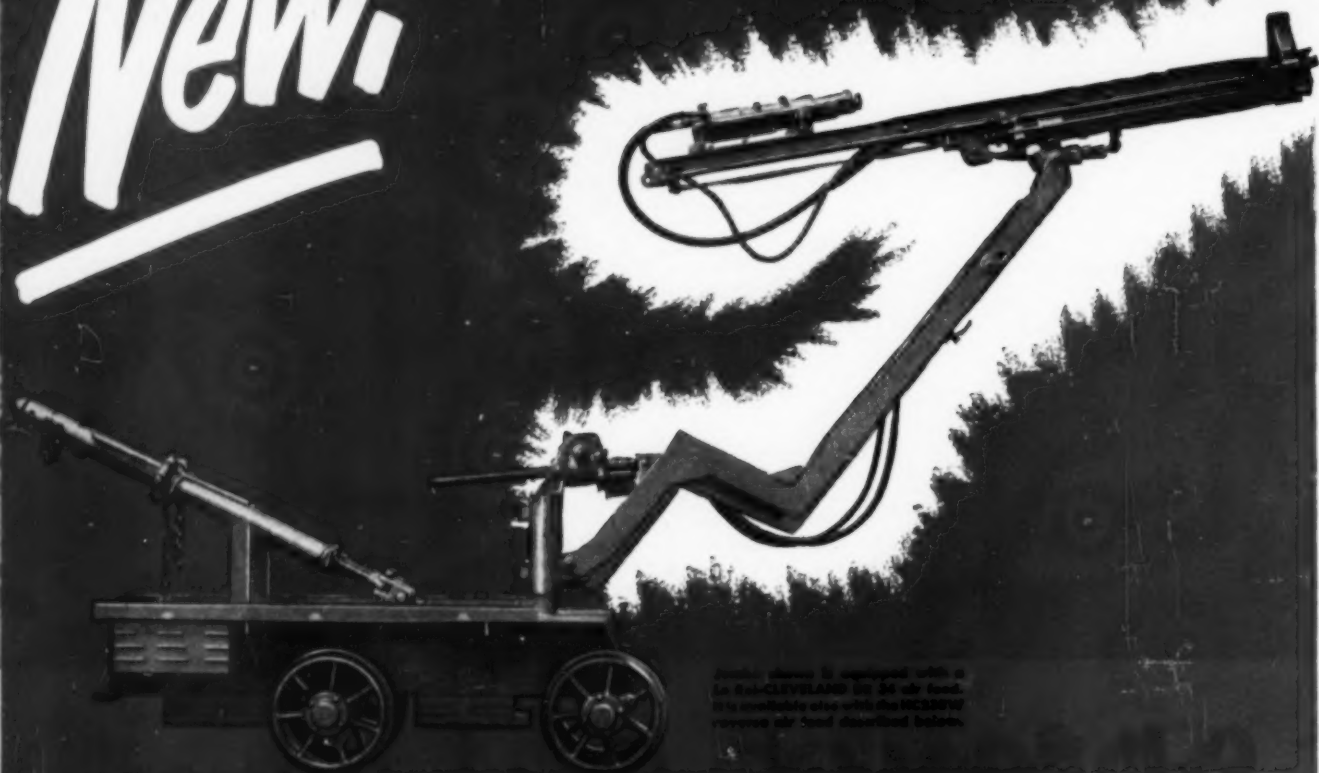
Consult a Compton Engineer for Details

**Compton, Inc.**  
ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

BOX 1946 — PHONE 4-6384 CLARKSBURG, WEST VIRGINIA

# New!

# Speeds up



Drifter shown is equipped with a Le Roi-CLEVELAND 30 3/4" air feed. It is available also with the HC23RW reverse air feed described below.



## Miners like Le Roi-CLEVELAND HC23RW Reverse Air Feed Drifters

### Management does, too

**Faster Steel Changes!** No swing or dump nuts to loosen and reset. Your miners simply swing drifter on feed cylinder and change steels. It's not only easy — it lets them drill out the round faster.

**No Stuck Steels!** Positive air feed keeps drills working at peak efficiency, avoids stuck steels.

**Higher Drilling Speeds!** Positive air feed plus proper force of blow and strong rotation give faster drilling speeds with both steel and tungsten carbide bits. You get longer bit life, too, and drill more footage.

**Low Upkeep Cost!** No feed screws or feed-screw nuts to wear. No complicated power-feed mechanism to give trouble.

**Easy to Operate!** Built to lighten the load on your miners. Feed controls conveniently located. Reverse air feed withdraws steel from hole quickly.

**Faster Set-ups!** The combination of Le Roi-CLEVELAND Air Feed Drifters and air columns gives you a unit that can be set up easily and quickly. And you can get the air column in any height you want.

# drilling cycles

## Le Roi-CLEVELAND *self-leveling* Mine Jumbo with four-foot steel-change Air Feed Drifter

***Saves time drilling lifters!  
Lets your miners drill the right  
round for any ground!***

You couldn't ask for more from a mine jumbo than the performance you get from this new Le Roi-CLEVELAND. It's got plenty of stuff. And the payoff for you is faster cycles, greater tonnage per man-shift, lower costs! Here's why:

**Self-leveling, air-motor-powered arm,** lets miners spot and space holes quickly and easily, for the most efficient fragmentation. They don't have to loosen a bolt or tilt a boom, to complete the drilling cycle.

**Exclusive rigid screw and gearing mechanism** keeps the heading straight, cuts down overbreak and underbreak. Keeps the drifters in line, prevents the steel from binding, reduces chuck wear.

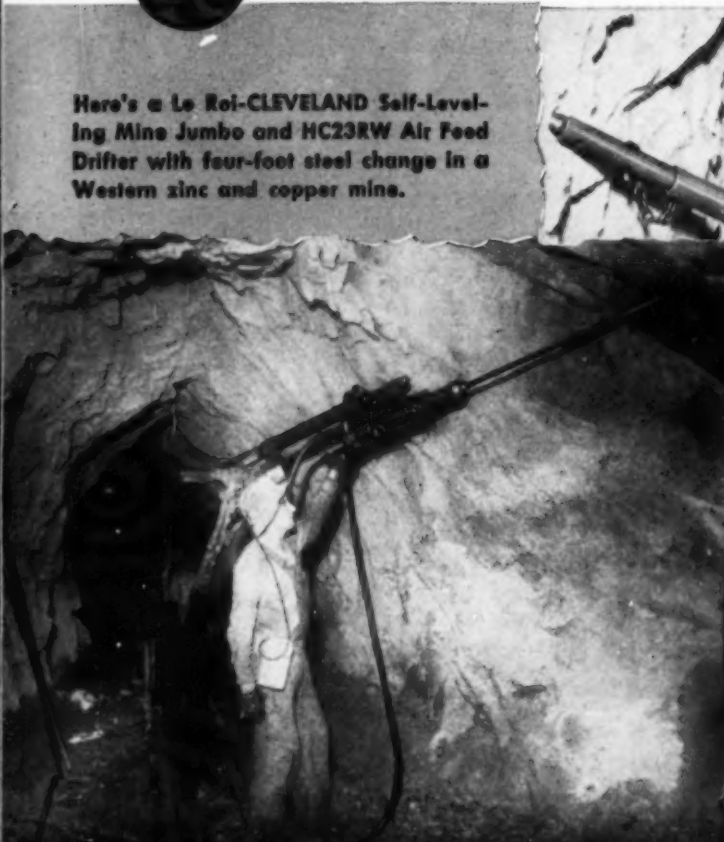
**Offset arm** provides plenty of clearance to drill lifters — without having to take time out to swing the drill under the arm.

You can get this Le Roi-CLEVELAND Self-Leveling Mine Jumbo in either single-arm or double-arm construction. Write for further information and see for yourself how either model can help you get more done every shift.




### LE ROI COMPANY

CLEVELAND ROCK DRILL DIVISION  
12500 Berea Road, Cleveland 11, Ohio  
Plants: Milwaukee, Cleveland and Greenwich, O.



Here's a Le Roi-CLEVELAND Self-Leveling Mine Jumbo and HC23RW Air Feed Drifter with four-foot steel change in a Western zinc and copper mine.



A compact Le Roi-CLEVELAND air motor powers the arm of this mine jumbo — lets miners take it easy, yet get more done.

22-48



# Cut Your V-Belt Costs Right Now!



—this test tells how!

If you want longer V-Belt wear and lower V-Belt costs just make this simple test. Bend any V-Belt that has *straight sides* and—as it bends—*feel* the sides bulge out! (See Fig. 1-A, below)

This out-bulge forces the belt to press unevenly against the V-pulley and of course wear on the belt is concentrated where it bulges most. Naturally this shortens the life of a *straight-sided* V-Belt.

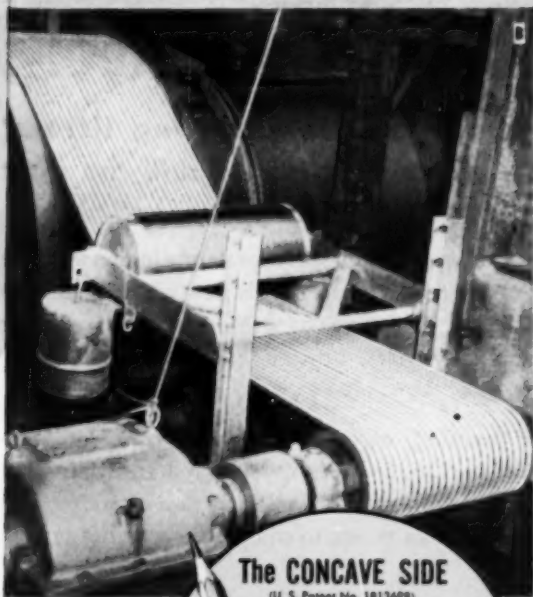
Now, make this same test with the belt that is built with *concave sides*—the Gates Vulco Rope!

See the difference? There is no *out-bulge*! The precisely engineered concave sides *fill out* and become *perfectly straight*. They now *exactly fit* the sheave groove and therefore *press evenly* against the V-pulley. This distributes all wear *uniformly* across the *full width* of the Gates Vulco Rope. And this means longer belt life and *lower belt costs* for you.

Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with Concave Sides—the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

Silica dust quickly wore out the gear and pinion drive on this sand drying drum. So a Gates man suggested building a flat pulley around the drum (as shown) and running V-Belts on it. Mr. M. D. Pinkerton, plant superintendent, says, "It cost about \$4300 to make the change but we are saving about \$15 per day without a bit of trouble. The original Gates Vulco Ropes are still good after running every day since September, 1949."



The CONCAVE SIDE

(U. S. Patent No. 1813692)



What  
Happens  
When a  
V-Belt Bends

Straight-Sided  
V-Belt



How a Straight-Sided V-Belt  
Bulges in the Sheave-Groove.  
Sides Press Unevenly Against  
the V-Pulley, Causing Extra  
Wear at Point Shown by the  
Arrows.

Gates Vulco Rope With  
Concave Sides



The Concave Sides Fill Out to  
Precise Fit in Sheave-Groove.  
No Side-bulge! Sides Press  
Evenly Against the V-Pulley  
—Uniform Wear and Longer  
Life!

CS-331

**Gates**

VULCO  
ROPE

**DRIVES**

THE GATES RUBBER COMPANY • DENVER, U.S.A.

V-Belts — Hose  
Molded Rubber Goods  
for Industry  
World's Largest Maker  
of V-Belts

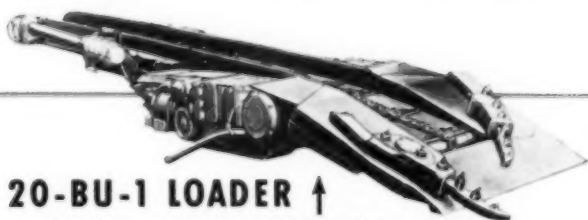


# Here's your Field-Proved, Mobile Cutter for very Low Vein Coal



... the JOY 12-RB Cutter

## and here's the rest of the JOY LOW VEIN TEAM



**20-BU-1 LOADER ↑**  
**and the 8-SC SHUTTLE CAR →**

Only 24" high, yet can load up to 8 tons per minute. Fast tramming, easily maneuverable, features independently driven conveyor and gathering head. While a shuttle car is away, the gathering arms can provide a fully-loaded conveyor ready for quick loading when the car returns. Also permits continued loading even if the gathering arms are momentarily stalled with hard digging.

### SULMET CARBIDE BITS

Joy Sulmet Bits, tipped with sintered tungsten carbide inserts, are made in a variety of types and different degrees of hardness to meet any mining condition. They fit any cutter, and by actual case records, out-perform every other bit on the market.



Meet the JOY 12-RB, above . . . the cutter member of the *only* mechanized mining team designed specifically for high-capacity production in very low vein coal. With the Joy 20-BU-1 Loader and 8-SC Shuttle Car, it assures field-proved flexibility and economy never before available to mines operating in extremely thin seams.

The 12-RB is a highly mobile and maneuverable rubber-tired cutting machine only 26" high, supplied either as a top or bottom cutter, and readily convertible. Its high tramming speed and variable hydraulic feed (which provides a cutting rate up to 70 ft. per minute) together permit cutting more places per shift. Bar tilt, roll and lift are hydraulically controlled, and steering is also hydraulic, with a separate motor serving the hydraulic pump.



Features 4-wheel positive drive, 4-wheel hydraulic steering, tapered-end design for minimum turning clearance, height of only 26" and level capacity of 2 tons. Separate motors for traction, conveyor drive, and hydraulic pump drive. Disc-type brakes on all wheels, hydraulic cable reel and hydraulically-adjustable elevating discharge.

# JOY

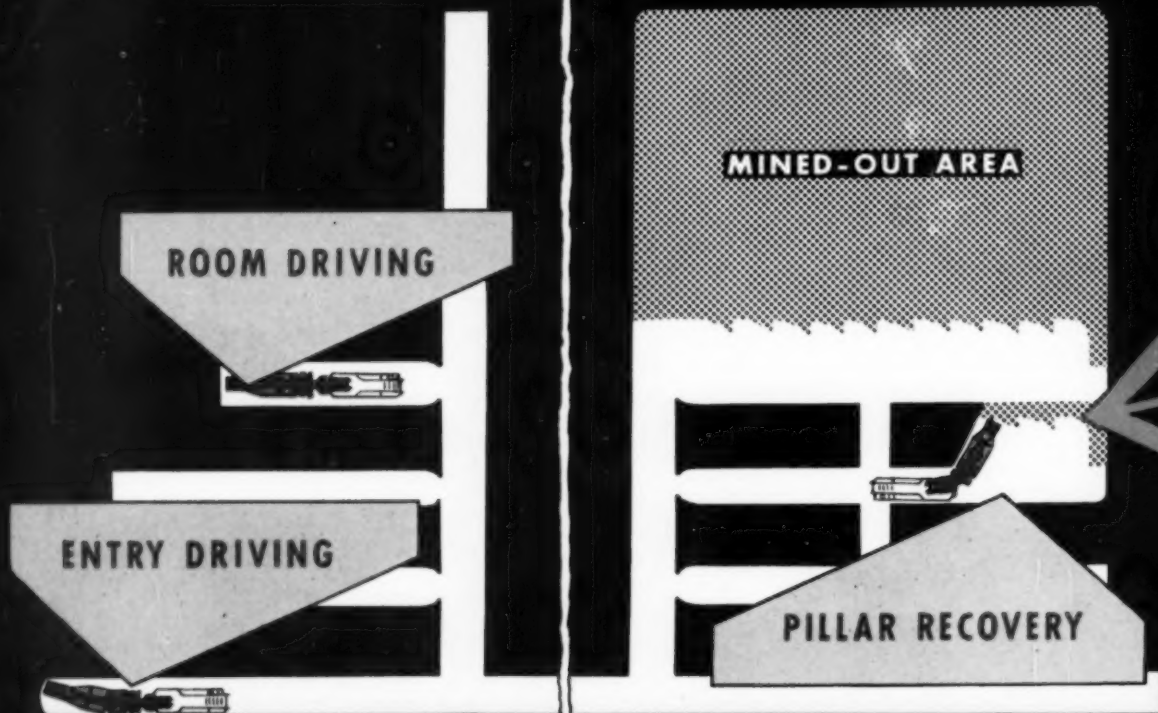
**WORLD'S LARGEST MANUFACTURER OF  
UNDERGROUND MINING EQUIPMENT**

JOY MANUFACTURING COMPANY, OLIVER BLDG., PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

W&D CL 4461

**THE FLEXIBILITY THAT MEANS PEAK EFFICIENCY!**



**YOU GET  
GREATEST COAL RECOVERY**

with the **JOY**  
**CONTINUOUS MINER**

**A** Joy Continuous Miner can operate in any mine it can enter. Thin seams, thick seams, split seams—all can be efficiently worked with this powerful, versatile machine that gets your coal without shooting . . . requires only the necessary additional equipment to transport the coal out of the mine.

Not only does the Continuous Miner do a quick, thorough job driving entries and rooms, it's also topnotch at pillar-recovery. These three main functions are illustrated in the drawing at the top of the page at left. Note how the Miner-and-shuttle-car team retreats after driving up a room, taking pillar as it comes back. The photo opposite shows a

JCM on pillar recovery in a midwestern mine.

The Joy Continuous Miner is built in two models and four heights. The 3-JCM can be either 34" or 39½" high, and will mine from 6" below to 66" above bottom. The 4-JCM is available in 48" or 53¼" heights, and will mine from 5½" below to 98½" above bottom. With special equipment the 3-JCM can mine to 76" above bottom, and the 4-JCM to 120" above bottom.

A Joy Engineer will furnish full details on the Joy Continuous Miner. He will show you exactly how it can be used for high-production mining in your operation, at absolute rock-bottom cost per ton of coal mined.

*Consult a Joy Engineer*


W&O CL 4160

**JOY MANUFACTURING COMPANY**

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO





The 10-SC, here being loaded by a JOY Continuous Miner, has the capacity, power and speed needed for real high-production work.



Complete hydraulic control, adjustable elevating discharge, and four-wheel drive and steering mean greater maneuverability, more flexibility.

# JOY

## 10-SC SHUTTLE CAR

**A RUGGED, HEAVY-DUTY  
MACHINE-**  
**field-proved for fast,  
dependable, low-cost transfer  
in high-production mining!**

Write for Bulletin, or

*Consult  
a Joy  
Engineer*



W&D CL 2920

# JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



# Barber-Greene

## B-G MINE CONVEYOR SYSTEMS FROM ROOMNECK TO TIPPLE

Made up of standard, factory-built "packaged" components. Eliminates "special" engineering. Complete installations made by simply putting together proper combination of easily assembled frames, supports, take-ups, etc.



### B-G SLOPE CONVEYORS

Slope conveyors meet every requirement—without the expense of special engineering or costly assembly—are available by combining the proper standardized permanent conveyor, factory aligned B-G Conveyor "packages." Frames, carriers, drives, take-ups, walkways, ladders. A frames and hoppers—are all delivered cleanly packed for easy erection. There is maximum flexibility in B-G design which enables you to lengthen, shorten or reassemble your B-G Slope Conveyor at different locations with 100% salvage.



### B-G MAIN ENTRY BELT CONVEYORS

Made up of self-contained, interchangeable sections, these conveyors are widely preferred for collecting from several panel conveyors, conveying to tipple, railroad cars, standard mine cars, slope conveyor, etc. For such permanent or semi-permanent services. Main Entry Belt Conveyors are built according to heavy-duty mining standards with large carriers, heavy drives, section frames of sturdy structural channel steel with welded steel supports. Standardized sectional construction simplifies transport of the unit to the location, speeds up installation. Note in photo at left how decking plates are bolted to the frame to fully protect the return belt.



### B-G PANEL BELT CONVEYORS

Standardized design allows for selection of panel frame units suited to head room, lump size and other pertinent conditions. For fast retract operations or in fast moving panel work, B-G Panel Frame units are easy to install, knock down or reassemble. Couplings are designed for maximum rigidity; sections are easily aligned, built to withstand heavy impact, adaptable to lowest head room operations.

Write for complete information about the Barber-Greene line of coal handling conveyors—including special conveyors for large loading, truck loading and stockpiling.



**Barber-Greene Company**  
AURORA, ILLINOIS, U. S. A.



PURCHASING DEPARTMENT

R.T.

Charley phoned  
shortly after noon to  
remind you to place  
track bolt order  
with Bethlehem.

Said he's always had  
good results with  
Bethlehem Bolts

Bob



Bethlehem Steel Company, Bethlehem, Pa.

On the Pacific Coast Bethlehem products are sold by  
Bethlehem Pacific Coast Steel Corporation  
Export Distributor: Bethlehem Steel Export Corporation

Other Bethlehem Fasteners  
for the Mine

SPIKES • RIVETS • THREADED RODS  
ROOF BOLTS AND ACCESSORIES  
STANDARD BOLTS AND NUTS



# Put it on the tough jobs—

THE HARD ROCK LUG CAN TAKE IT!



**F**OR rough, tough, off-the-road hauls, you want tires that will keep your trucks moving on schedule with full pay loads—safely, surely, month after month. For such service the Goodyear Hard Rock Lug has no equal.

That's because the Hard Rock Lug is a product of Goodyear's unrivaled experience in building 575 million tires—far more tires for more different specialized uses than any other manufacturer. Look at its features and you'll see why it's the favorite of cost-wise operators. Goodyear, Truck Tire Department, Akron 16, Ohio.

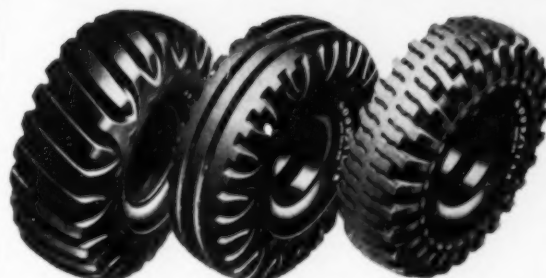
**"America Needs Better, Safer Roads—  
Let's Bring Them Up To PAR."**

**FOR EACH JOB, THERE'S A  
COST-CUTTING GOODYEAR TIRE!**

# GOODYEAR

**MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND**

*We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network*



#### **HARD ROCK LUG**

Super-tough champ in all types of tire-killing work. Sidewalls armored by massive lug bars, extra-thick undertread protects extra-thick body. Self-cleaning tread delivers top traction, forward or reverse.

#### **HARD ROCK RIB**

Companion tire for front wheels on all tire-killing service. Easier steering, smoother rolling. Same cord body, same shoulder and sidewall as HARD ROCK LUG.

#### **ROAD LUG**

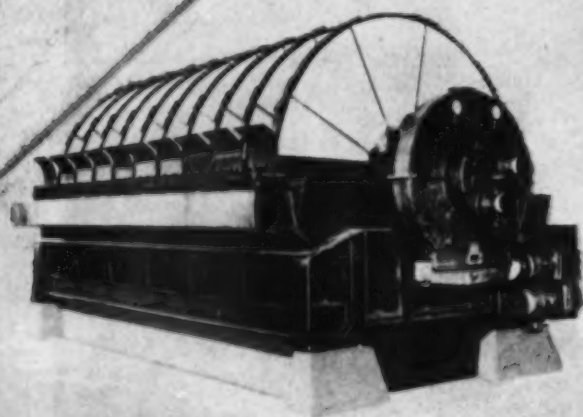
High-stamina, dual-purpose tire, best for trucks that operate both ON and OFF the road. Tough construction and special tread design provide super traction off the road—long, smooth mileage on the road.

Road Lug—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



Laboratory Test Unit available to plants wishing to test the filterability of fine coals.

## RECOVER COAL FINES WITH EIMCO AGIDISC



Above: 10'8" diam. x 10 disc Eimco Agidisc filter.

Eimco Agidisc filters are heavy-duty, dependable machines built for continuous 24 hour operation in dewatering fine coal. These filters will:

1. Reduce moisture content in the fine coal to 15% or better, depending on the other plant equipment.
2. Produce a clear filtrate which contains less than the allowable ppm solids permitted under existing anti-pollution laws.
3. Permit uniform cake distribution over the entire surface of the disc with a resultant even drying of the fine coal filter cake.
4. Produces greater tonnage of dewatered coal per square foot of filter surface.
5. Save a product that has been considered too expensive to process—providing additional profits per ton of coal washed.
6. Pay for itself in a very few months.

Eimco Agidisc filters are doing an outstanding job in many coal washing plants and coal pond reclamation projects. Arrangements can be made to put a test unit in your plant. If you are interested please write.

# EIMCO

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment  
EXECUTIVE OFFICES AND FACTORIES: SALT LAKE, CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

NEW YORK: 3112 SOUTH STREET • CHICAGO: 3319 SOUTH WALLACE STREET  
BIRMINGHAM: 218 3110 FRYETTE AVE. • DULUTH, MINN.: 216 E. SUPERIOR ST.  
EL PASO, TEXAS: MILL BUILDING • BERKELEY, CALIF.: 637 CEDAR STREET  
KEEOG: IDAHO: 307 DIVISION ST. • LONDON: W. 1, ENGLAND: 190 PICCADILLY

IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE

IN ENGLAND: EIMCO GREAT BRITAIN LTD., LEEDS 12, ENGLAND

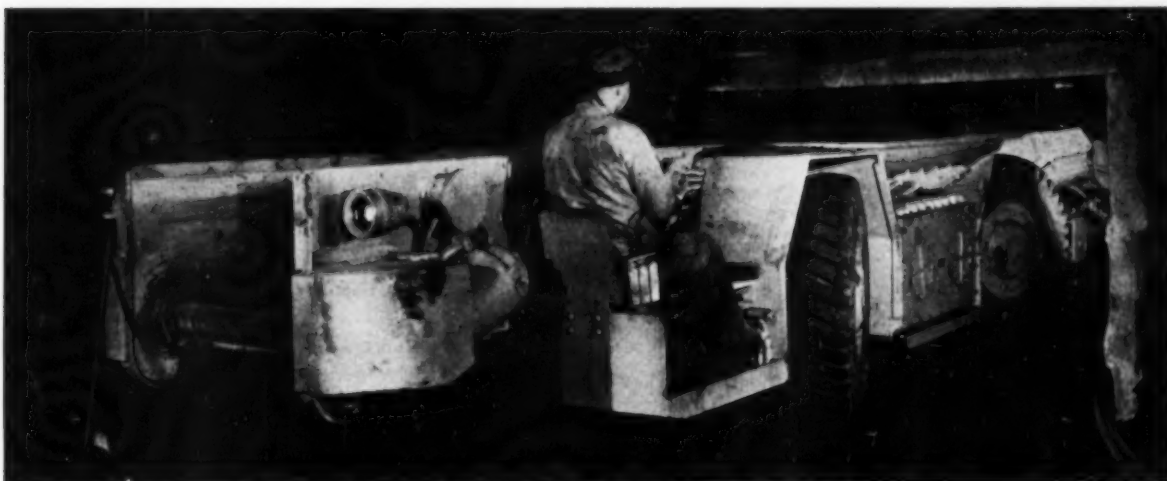
IN ITALY: EIMCO ITALIA S.P.A., MILAN, ITALY



**Buy Safe!** Don't gamble  
on just any shuttle car cable—  
you may lose



One break is trouble enough. Frequent breaks prove your cable faulty. Down time and repair losses soon mount higher than original cable costs. It's just common sense to buy the best in the beginning.

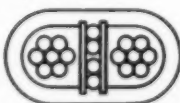


for longer "break-free" service insist on

## Cold Rubber Insulated **Securityflex**



This is Anaconda Securityflex Shuttle Car Cable. Note patented breaker strip and D-shaped insulation to prevent overriding. No other cable offers these plus features.



Almost any cable looks good when new. It's *service* that counts. ANACONDA Securityflex\* portable power cable serves well through many, many hours of tough, rough use. There's a good reason why.

Cold rubber insulation — an ANACONDA First — is 50% more resistant to moisture than regular rubber. Special-strength neoprene jacket takes abrasion, heat, rockfall, and run-overs in stride where other types fail.

Securityflex functions nicely. Under reel tension, over guides, and in frequent sharp bends, it doesn't fatigue readily.

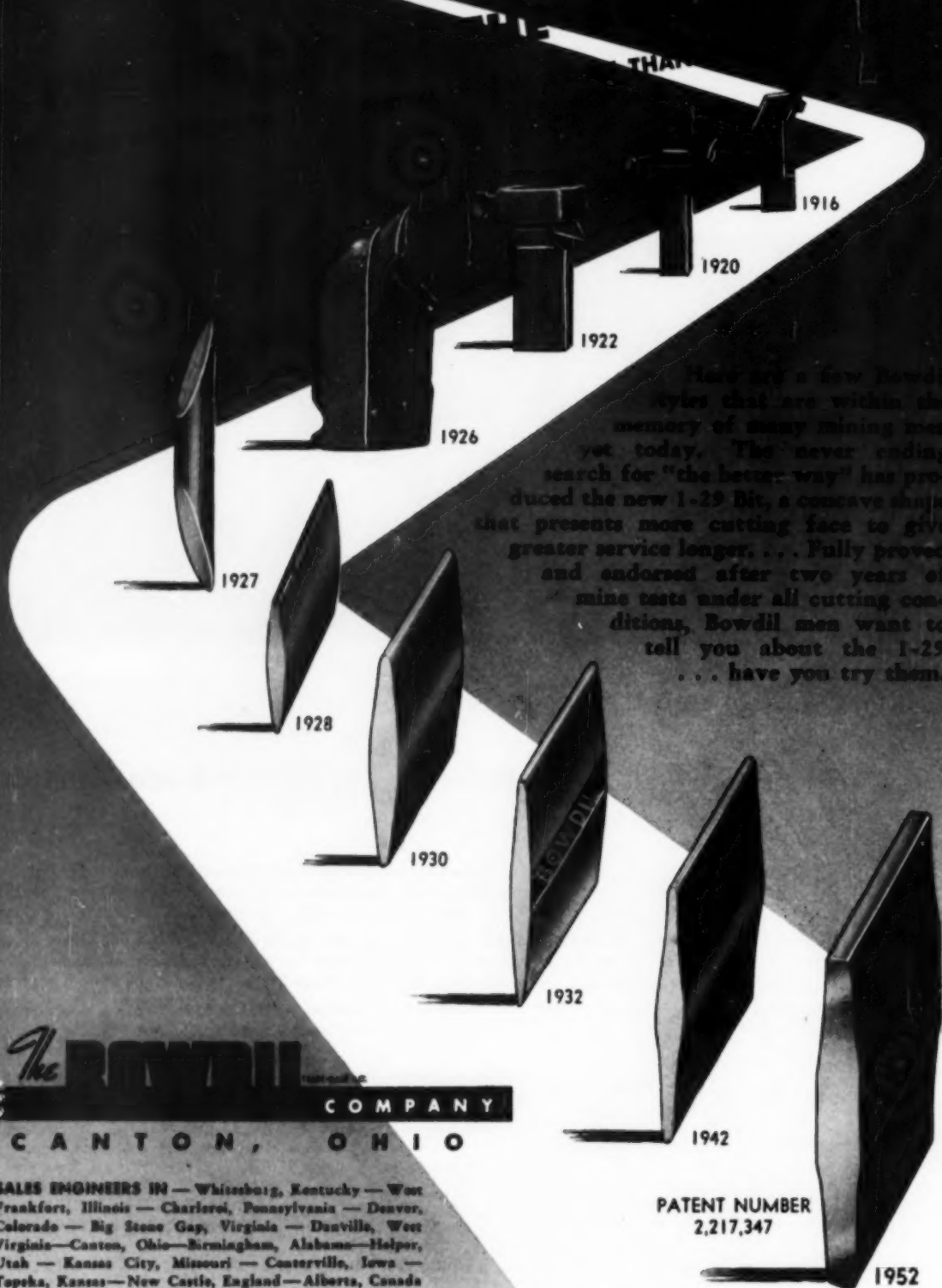
It won't override, kink, or twist.

This ANACONDA Cable is safe—a look at the patented "anti-short" breaker strip and D-shaped insulation tells why. This is *plus* protection.

Write your nearest Anaconda Sales Office or Distributor for more information. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

\*Trademark 10001

the right cable for the job **ANACONDA**® wire and cable



Here are a few Bowditch styles that are within the memory of many mining men yet today. The never ending search for "the better way" has produced the new 1-29 Bit, a concave shape that presents more cutting face to give greater service longer. . . Fully proved and endorsed after two years of mine tests under all cutting conditions, Bowditch men want to tell you about the 1-29 . . . have you try them.

*The* **BOWDITCH**

COMPANY

CANTON, OHIO

SALES ENGINEERS IN — Whitesburg, Kentucky — West Frankfort, Illinois — Charleroi, Pennsylvania — Denver, Colorado — Big Stone Gap, Virginia — Danville, West Virginia — Canton, Ohio — Birmingham, Alabama — Helper, Utah — Kansas City, Missouri — Centerville, Iowa — Topeka, Kansas — New Castle, England — Alberta, Canada

PATENT NUMBER  
2,217,347

# Announcing

## NEW BOWDIL BIT

1. Easier cutting
2. Faster cutting
3. Coarser cutting
4. More productive cutting
5. Less big-dust

6. Less dust
7. Less vibration
8. Less noise
9. Less wear on the cutting tool
10. Less wear on the cutting tool

PATENT NUMBER  
2,217,347

GREATER  
CUTTING  
FACE

SPECIAL  
ALLOY  
TOOL  
STEEL

PATENTED  
CONCAVE  
SHAPE STAYS  
SHARPER  
LONGER

HEAT TREATED  
TO HARDNESSES  
BEST SUITED  
TO YOUR  
CUTTING  
CONDITIONS

SEE-TRY-the new 1-29 Bowdil Bit

**The BOWDIL Company**  
CANTON, OHIO

Gentlemen:

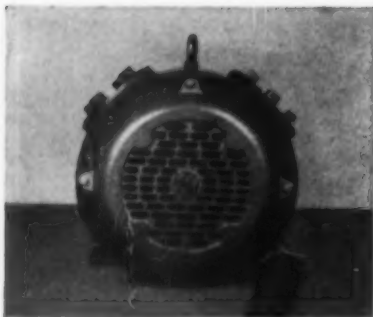
☐ Have your representative see us.

NAME .....

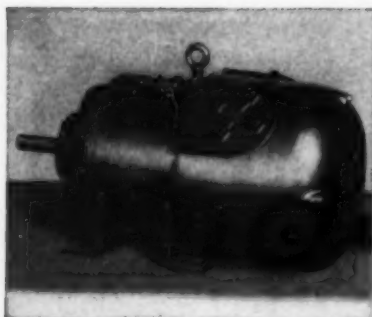
COMPANY .....

ADDRESS .....

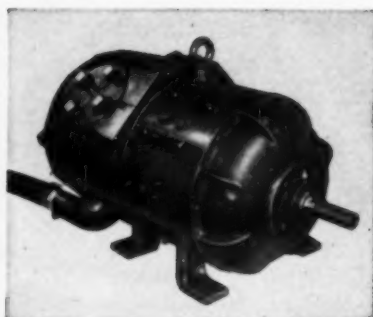
CITY..... STATE.....



**1 EASY-TO-INSTALL** G-E mine motors are compactly built, occupy minimum space on mining machines. Cable gland does not protrude.



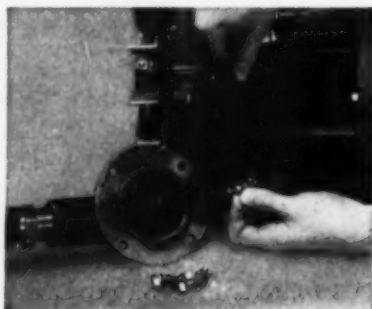
Standard hand-hole covers on top half of motors are easily removed, providing quick access to conveniently-located brushes.



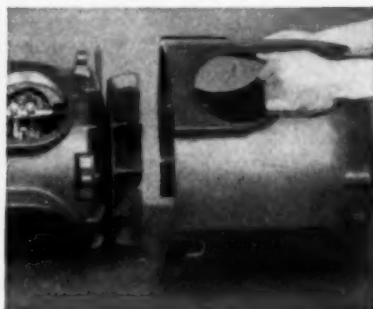
Jig-drilled feet assure uniform mounting. Screw-in type lifting eye, at motor's center of gravity, speeds installation.



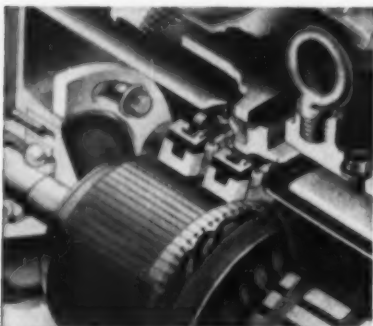
**2 EASY-TO-MAINTAIN** G-E mine motors have new two-stud brush construction with all brushes readily accessible.



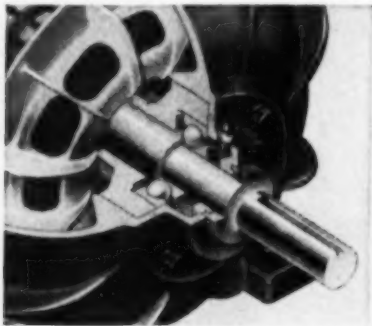
New cables can be connected in the mine, without removing end shield, thanks to gland design, and terminals on extra-long internal leads.



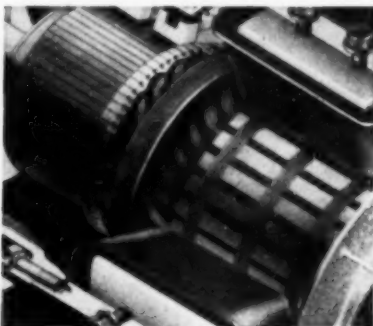
Sturdy, shock-resistant fan housing held in place with two machined fits, is easily removed to give access to external fan.



**3 LONG-LASTING** G-E mine motors have brush holders that are corrosion- and wear-resistant—provide adjustable brush pressure.



Ball bearings of generous capacity make the motor suitable for driving direct-connected, belted, geared, or chain-driven loads.



Moisture-resistant insulation system minimizes effects of moisture absorption which can cause mine-motor insulation failures.

## Three ways new G-E mine motors help mining men reduce costs

Today's high-capacity mining machinery relies strongly on motor design, dependability and simplified maintenance to keep costs low.

The three features pictured above—ease of installation, ease of maintenance, and long life—show

how the new General Electric mine motor meets these requirements. For complete data, ask your nearest G-E Apparatus Sales Office for Bulletin GEA-5553. Or write to General Electric Company, Section 663-32, Schenectady 5, New York.

**GENERAL**  **ELECTRIC**



IT'S THE

# "GIVE"

## In O-B Couplers that Protects Mine Cars

Restrained slack between mine cars permits cars equipped with O-B Automatic Couplers to stand off the worst sort of mine haulage punishment. This slack comes from rubber pads which compress—or give—to absorb blows, but which also expand again to keep all coupler parts bearing firmly on one another. No part of an O-B Coupler can flop about loosely—engaged or unengaged.

These rubber pads form the draft gear of O-B Automatic Couplers. They give when necessary; they always regain their original shape; they hold unengaged couplers ready to join with mating heads.

Restrained slack protects and prolongs car life when O-B Automatic Mine Car Couplers are in use. That's one pretty good reason for choosing O-B for your new or remodeled cars!

O-B Automatic Mine Car Couplers on these 30-ton mine cars give protection from haulage jolts and jerks by absorbing that punishment in durable rubber draft gear.





## Roof Bolting Promotes Safety ...Helps Increase Production

Your mine becomes a safer place when roof bolting is used. That is because roof bolting minimizes the need for timbers, and because the bolts consolidate layers of strata into a thick beam, preventing sagging.

Roof bolting helps increase production, too, as loading machines can clean from rib to rib without need for hand-shoveling. It also offers these other advantages: (1) increased economy, (2) faster haulage,

(3) greater side clearances, and (4) improved ventilation.

To help mine operators obtain these ideal conditions, Bethlehem manufactures two kinds of roof bolts—the square-head type and the slotted type. Each bolt has its proper application, depending on the kind of roof encountered. For complete information about roof bolts, please write to us at Bethlehem, Pa.

### A. SQUARE-HEAD ROOF BOLT

*(With Expansion Shell)*

An assembly, consisting of unchamfered square-head rolled-thread  $\frac{3}{4}$ -in. bolt, and expansion shell. Two pressed ears on bolt shank support shell during anchoring. Plug is forced into shell when bolt is tightened, expanding leaves of shell to provide holding-tension. Sharp projections on leaves lock against sides of hole, to prevent shell from turning when bolt is rotated. Recommended hole size,  $1\frac{1}{2}$  in.

### B. SLOTTED ROOF BOLT

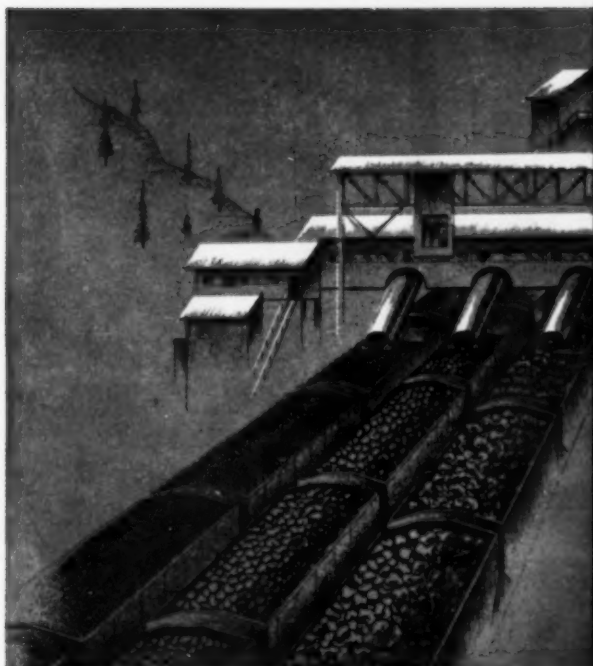
Has forged slot, centered by exclusive process which forms the equivalent of two half-rounds. Slot accommodates wedge. Opposite end of bolt has 5 in. of 1-in. rolled threads. When driven against back of hole, wedge is forced deep into slot, expanding ends of bolt to provide tight grip. Comes with truncated cone point, and American Standard Regular Square Nut. Recommended hole size,  $1\frac{1}{4}$  in.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation  
Export Distributor: Bethlehem Steel Export Corporation*

## BETHLEHEM MINE ROOF BOLTS





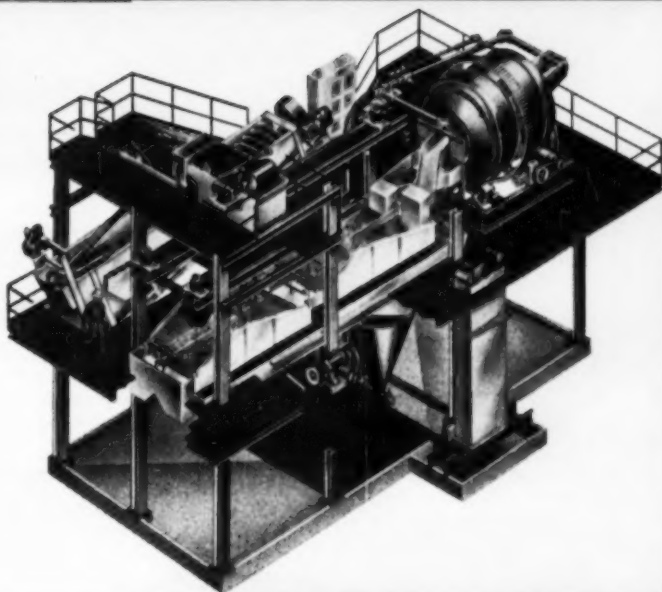
# CLEAN COAL THE PROFITABLE WAY!

## WITH WEMCO MOBIL MILLS

Today's coal market demands modern cleaning equipment designed to produce a premium-priced product, even from substandard workings.

**WEMCO MOBIL MILLS**, employing Heavy Media Separation, make available the most modern, most economical method of coal cleaning for the vast majority of operations. They assure high yield of **salable** coal at predetermined grade to meet varying market demands.

Mobil Mill cleaning is **precision cleaning**. It provides close control of washing operations and the flexibility needed for efficient cleaning over a wide range of sizes and grades. For coals containing middlings, the WEMCO MOBIL MILL with Double Drum Separator is the **only** HMS plant capable of producing **three** products by absolute gravity control. Accurate segregation of bone and other middlings from true float coal and true refuse permits re-crushing and washing of this middling to produce a salable third product.



To fit your particular requirements, Mobil Mills are offered in a number of sizes with a choice of three basic types:

- 1 **Drum Type Mobil Mill** for accurately controlled washing of a full range of sizes from 8" to 1/4" with capacities up to 420 TPH.
- 2 **Double Drum Type Mobil Mill** for efficient cleaning of coal having complicated middling and washing characteristics. Capacities dependent on individual problem.
- 3 **Cone Type Mobil Mill** for efficient, large volume production of fine coal in sizes 4" to 3/32", with capacities up to 420 TPH.

Write today for Bulletin M-3-M-4 and for a WEMCO recommendation on your coal cleaning operations — furnished without cost or obligation.

# WEMCO

WESTERN MACHINERY COMPANY

760-766 JOUSOM STREET - SAN FRANCISCO 7, CALIFORNIA

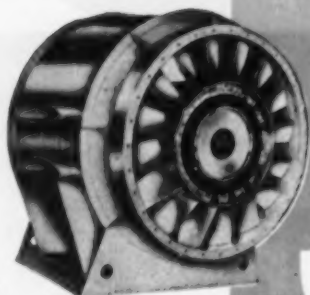
#### OTHER WEMCO PRODUCTS

Mobil-Mills • Coal Spirals • HMS Thickeners • HMS Pumps • Sand Pumps  
Cone Separators • Drum Separators • Fagergren Laboratory Units • Agitators  
Fagergren & Steffensen Flotation Machines • Hydroseparators • S-H Classifiers  
HMS Laboratory Units • Dewatering Spirals • Thickeners • Conditioners • Densifiers

## AXIVANE® MINE FANS

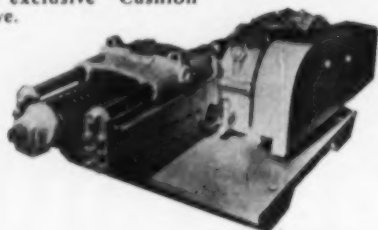
Vaneaxial-type fans for all main ventilation requirements—also Portable Blowers for auxiliary ventilation.

\*Reg. U.S. Pat. Off.



## SHAKER CONVEYORS

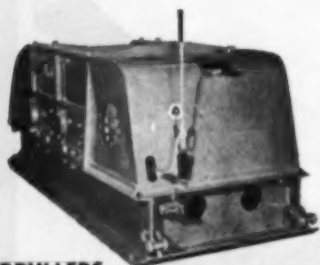
Below, the exclusive "Cushion Stroke" drive.



# JOY

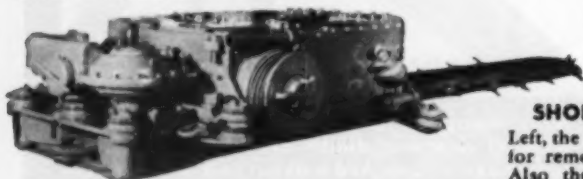
## CONTINUOUS MINERS

Models for high and low coal.



## CARPULLERS

Other utility equipment includes a Caterpuller, Pulldozer, Timber Setter, Material Trucks, etc.



## MOBILE COAL CUTTERS

Above, the 12-RB Cutter, designed for very low coal. Other trackless units include the 10-RU and 11-RU Universal Cutters.



## SHORTWALL COAL CUTTERS

Left, the 11-B Cutter, with Joy Bugduster for removal of cuttings from the kerf. Also the 7-B Heavy Duty, and 5-B1 Cutter, for small mines.



## LOW VEIN SHUTTLE CARS

Above, the 8-SC Shuttle Car, only 26" high for use in very low coal. The Joy line includes Shuttle Cars in heights, types and drives to meet any coal-mining conditions.



## MECHANICAL LOADERS

Above, the 20-BU, a high-capacity Loader only 24" in height for very low coal. Other Joy Loaders to meet any need.

## HYDRAULIC ROOF-BOLTING DRILL

Above, the RBD-1, fastest drilling machine built for roof bolting. Joy also builds a complete line of hydraulic Coal Drills, single and twin boom.



# ...Your Complete Source of Mechanized Mining Equipment

*FIELD-PROVED to Give You  
Greatest Production Increases  
and Cost Reductions*

JOY Mechanized Mining Equipment is the result of years of pioneering research, development and on-the-job engineering. It is the world's most complete line of modern mining machinery, built by the world's largest manufacturer in the field.

These facts have real importance for you because they give you positive assurance of equipment that can stand the gaff, stay on the job and operate with the sustained high efficiency that means greater tonnage and lower costs. Whatever your requirements or seam conditions may be, in soft coal or hard, there's a field-proved JOY unit to do the job best. • Let us work with you.

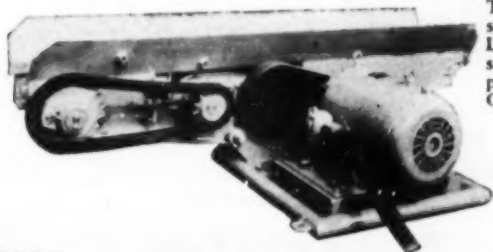
## PERMISSIBLE MINE-AIR COMPRESSORS

B. of M. approved. Self-propelled (the WK-83, right) or draw-bar models, up to 240 CFM.



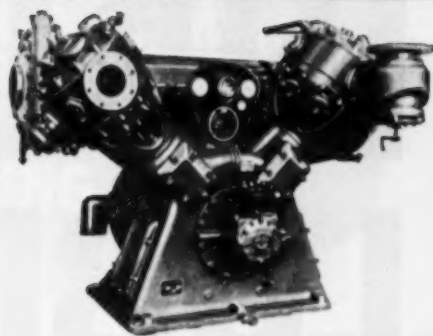
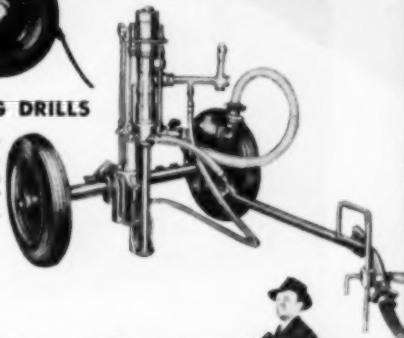
## BELT and CHAIN CONVEYORS

Types and sizes to suit any conditions. Left, the new, light, simple and compact FA Chain Conveyor.



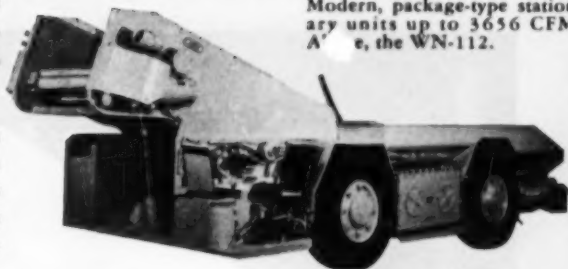
## ROOF-BOLTING DRILLS

Right, the highly-mobile, fast-drilling SAW Wagon Stoper. Other drills for any roof-bolting need.



## AIR COMPRESSORS

Modern, package-type stationary units up to 3656 CFM. Above, the WN-112.



## HIGH-CAPACITY SHUTTLE CARS

Above, the 10-SC—a rugged, heavy-duty Shuttle Car that can handle coal and rock in full seam mining.

W&D CL 3096

*Consult a Joy Engineer*



# JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

# HUNDREDS OF MACHINES—BUT ONLY ONE GREASE!

Read how another manufacturer simplifies and saves with

# PURE OIL INDUSTRIAL LUBRICANTS



## Simplify and Save

A large midwestern metal-working plant produces chrome-plated trim (hub caps, grills, etc.) for the automotive industry. All types of metal-working equipment—400-ton presses, shears, drills, lathes, roller-levelers and grinders—are used as well as huge chrome-plating machines. Yet *only one grease*—Pure Oil's POCO HT GREASE B—and one dispenser is used for *all* applications! And in 3 years there has been no down time due to lubrication failures!

Here at Pure Oil  
we specialize in

industrial oils and greases designed to do several *different* jobs—instead of one specific job.

And to do each job equally well.

For this reason, our technical experts can nearly always help you to reduce your lubricants inventory . . . simplify your lubricating procedure . . . minimize waste and error.

One of our technical experts will be glad to give you full details, right away. Just call your local Pure Oil office\* or write:

**THE PURE OIL COMPANY** Industrial Sales  
35 E. Wacker Drive, Chicago 1, Illinois

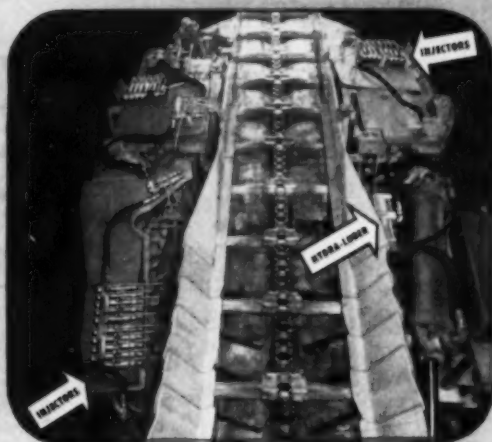
**Be sure with Pure**

\*Sales offices in more than 500 cities, including: Atlanta, Georgia • Birmingham, Alabama • Charlotte, North Carolina • Chattanooga, Tennessee • Columbus, Ohio • Hattiesburg, Mississippi • Indianapolis, Indiana • Jacksonville, Florida • Madison, Wisconsin • Memphis, Tennessee • Miami, Florida • Minneapolis, Minnesota • New York, New York • Norfolk, Virginia • Parkersburg, West Virginia • Pensacola, Florida • Sanford, Delaware

## At Central Coal Company's Philip Sporn Mine...



Closeup showing the compactness of this typical Lincoln CentrOmatic installation.



Lincoln Centralized Lubricant Application System installed on Goodman Model 660 Mobile Loader. System on each loader includes one Model 1820 Hydra-Luber, hydraulically operated pump, and injectors serving 68 bearings, simultaneously.

## *Lincoln* Centralized Lubrication Systems SAVE DOWNTIME... REDUCE OPERATING COSTS

Downtime on key production units like these mobile coal loaders means money down the drain. To gain the maximum advantage from its investment in modern production machinery, Central Coal depends on Lincoln Centralized Lubrication Systems. Downtime for lubrication or replacement of prematurely worn bearings is eliminated. The Lincoln System *automatically* supplies the Right Lubricant at the Right Time, in the Right Quantity, to every bearing while Loaders are operating.

**CUT YOUR COST PER TON** with the time-saving advantages of Lincoln Centralized Lubrication Systems. In addition, all the hazards of hand lubrication are eliminated and contamination of lubricant is virtually impossible. For complete information, write for Bulletin 680.



**LINCOLN ENGINEERING COMPANY**  
5729 Natural Bridge Avenue  
St. Louis 20, Missouri

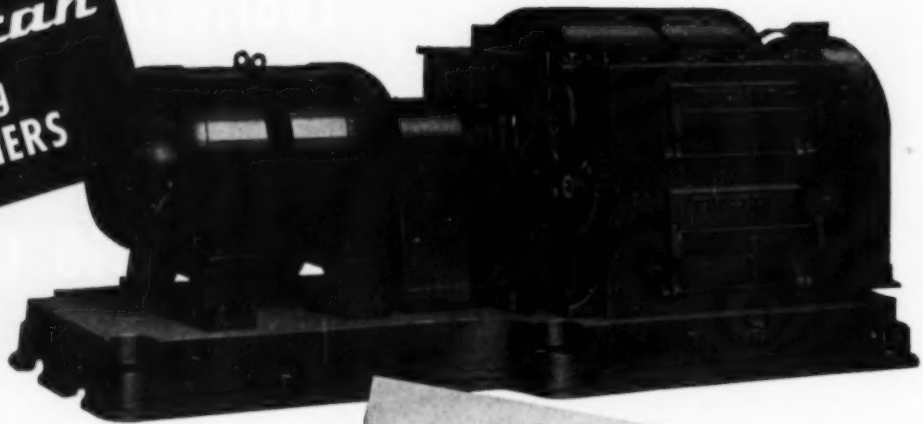
... PIONEER BUILDERS

**LINCOLN**  
LUBRICATING EQUIPMENT ...

# CRUSHING UNLIMITED!

*the story of 61,000,000 tons of coal  
crushed at less than 1¢ per ton!*

*American*  
rolling ring  
COAL CRUSHERS



The facts are in! The story of American Crusher performance—rugged, long-life-low-cost performance—is now available for your careful study. Not just one case history, or scattered reports—but a thorough survey of American installations (power plants, central stations, and mines) across the nation. Here are the “crushing” facts:

Total Tonnage Handled . . . . .61,000,000 Tons  
Average Age of Crushers . . . . .9.5 Years  
Replacement Parts (Including Standby Parts)  
1/10 of 1¢ per Ton

There can be no better proof of American's superlative endurance and economy of operation!

Typical Survey Results			
LOCATION	CRUSHER	TONNAGE	PARTS REPLACEMENT COST
N. J. Central Station	42-S	6,000,000 Tons	\$0.0025 per ton, 20-year-old installation!
W. Va. Industrial Power Plant	38-S	10,008,000 Tons	\$0.0008 per ton, 10 years in service!
Illinois Coal Mine	AC3-E	4,000,000 Tons	\$0.0005 per ton for 10 years service!
W. Va Coal Mine	38-S	2,514,000 Tons	\$0.0007 per ton, 23 years old!
Ill. Power Plant	42-S	2,950,000 Tons	\$0.0004 per ton, 6 years in service.
		4,000,000 Tons	\$0.0005 per ton for 10 years service!



WRITE today for your copy of  
"Crushing Coal at Less Than 1¢ Per Ton"

*American*

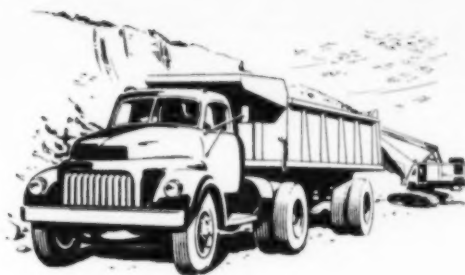
**PULVERIZER COMPANY**

*Originators and Manufacturers of  
Ring Crushers and Pulverizers*

1119 Macklind Ave.  
St. Louis 10, Mo.



# Eaton 2-Speed Axle Trucks haul more, quicker, longer,



Eaton 2-Speeds give drivers the right gear ratio for road, load, and traffic conditions; permit quicker trips with full loads; reduce both operating and maintenance costs, make trucks last longer and worth more when traded in.

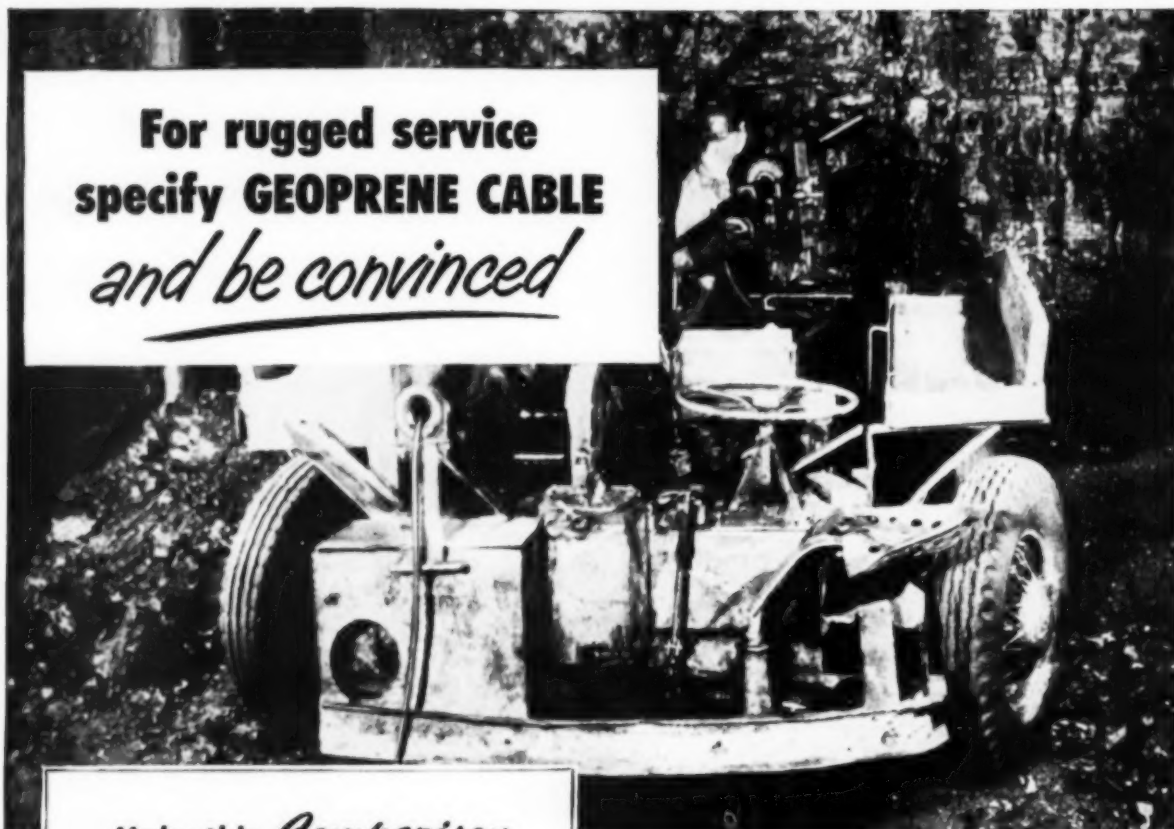
Ask your dealer for performance-record proof.

**EATON** ——— AXLE DIVISION ———  
MANUFACTURING COMPANY  
CLEVELAND, OHIO



**PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

**For rugged service  
specify GEOPRENE CABLE**  
*and be convinced*



### Make this *Comparison*

Check these figures, and compare typical Geoprene values with ASTM requirements.

ORIGINAL	ASTM Requirements	Geoprene Typical Values
Tensile strength, lb/sq in.	1800	3000
Per cent elongation	300	500
Set in 2-in. test piece, in.	3/8	1/16
After 7 days in Geer oven at 70 C		
Tensile strength, lb/sq in.	1600	2900
Per cent elongation	250	430
After 96 hr in oxygen bomb at 70 C		
Tensile strength, lb/sq in.	1600	2800
Per cent elongation	250	430
After 18 hr in oil at 121 C		
Per cent depreciation in tensile strength	40	35
Per cent depreciation in elongation	40	35
Tear Test		
Tensile strength, min lb/in.	40†	75

†This is the requirement for rubber jackets; no tear value has yet been set for neoprene-type jackets.

**General Electric  
Wires and Cables**

**FOR MORE TONS  
PER MACHINE  
PER DAY!**

On the tough jobs—where portable tools or heavy equipment are used—specify tough, abrasion-resistant General Electric Geoprene cable. Geoprene's rugged neoprene-based jacket resists oils, acids, alkalis, sunlight, and flame. A tough, corded reinforcing mesh enables it to take the hauling and dragging that your job requires. Specify Geoprene cable. Let it convince you by on-the-job results that G-E Geoprene cable offers extra service, extra tons per dollar.

In the full line of General Electric wires and cables you'll find the cable you need. This famous line includes G-E No. 1799 varnished-cambric-insulated cable, Super Coronol® cable, wire armored cable, interlocked armor cable, aerial cable and mine telephone cable . . . Flamenol® control wire and magnet wire.

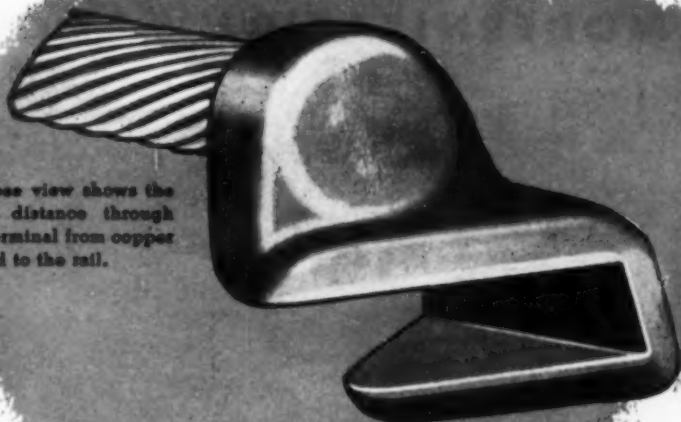
Send for your free copy of the 24-page booklet, *General Electric Wire and Cable for the Mining Industry*. Section W20-114, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

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*You can put your confidence in—*

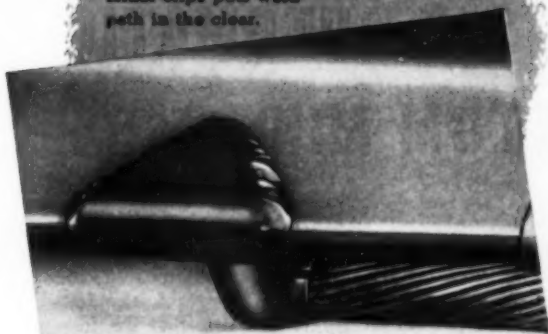
**GENERAL  ELECTRIC**

A close view shows the short distance through the terminal from copper strand to the rail.



# You can SEE the advantages **IN THIS BOND!**

Triangular-shaped terminal clips puts weld path in the clear.



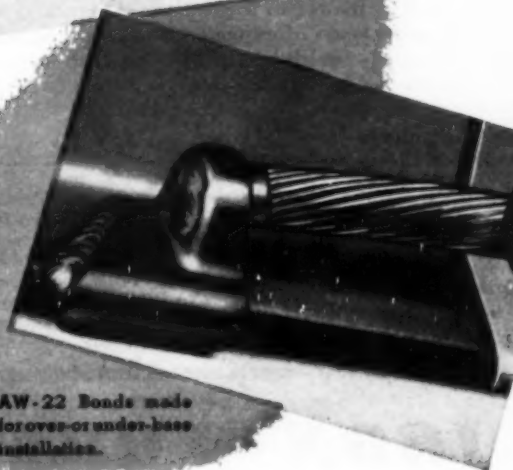
Because of the shape of its terminal, it's easy to see why this AW-22 bond can be welded quickly and easily! Terminal edges are at an angle to the length of the rail, putting the weld path out in the clear. The welder moves his rod along an unhampered path, well away from the rail head.

Terminal shape shows another advantage for easy welding. Note the bevel on the terminal edges. This bevel makes a wide angle between the rail base surface and the terminal, and creates an open welding area that is readily reached with welding rod.

Shape provides this O-B AW-22 Rail Bond with a third visible, important advantage—a truly *short* rail-to-copper electrical path. Bond strand welded to the outer face of the terminal is just as close as possible to the weld that joins terminal and rail together.

Seeing is believing! Ask your O-B representative to show you an O-B AW-22 Rail Bond, and see these advantages for yourself!

AW-22 Bonds made for over-craner-base installation.

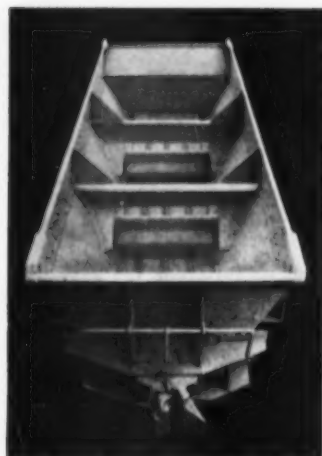


**Ohio Brass**

MADE IN U.S.A.

4342-M

# UNITED STATES POTASH CO. CONTINUES MODERNIZATION PROGRAM AT CARLSBAD . . .



Photos show how S-D Automatic was constructed for heavy-duty service at Carlsbad. In large photo doors are open and in photo at left doors are closed.

## INSTALLS S-D AUTOMATIC DROP BOTTOM MINE CARS

The most recent development in the U. S. Potash modernization program at Carlsbad, New Mexico is the installation of 25 S-D Automatic Cars.

The S-D Automatic Drop Bottom Cars will haul potash non-stop because trips dump-on-the-move. A tripping device mounted between rails automatically opens the doors as each car moves over opening between rails at the Surge Bin. After dumping load and as each car moves out of the bin, a closing device automatically locks doors shut. Expensive dumping equipment and dumping labor are both eliminated.

The capacity of each car is between 8 to 10 tons. Each is approximately 16½ feet long by 5½ feet wide by 48 inches high. All cars are sealed against dust leakage and operate on a 42 inch track gauge. These cars are built of ½ inch steel for heavy-duty performance.

But this page isn't big enough for the whole story. We point out this Carlsbad installation as evidence

that heavy-duty S-D Automatics offer the most practical and most economical method of haulage for many metal and non-metallic mines. At the same time, you will not want to overlook the fact that in your particular operation our S-D Rocker-Type Side Dump Cars or our S-D Rotary Cars may be the logical answer to lower costs. Certainly, our more than 50 years of experience in building mine cars exclusively for almost every conceivable operation places us in an excellent position to build the exact car needed for your operation.

Our engineers are available at any time to assist you in adapting the S-D Automatic Car to your operation. Sanford-Day Iron Works, Knoxville, Tenn.

*After 50 years of leadership in the industry, Sanford-Day still devotes its entire capacity to the production of mine cars. Most of the improvements in mine car design and construction originate with this company.*




## SANFORD-DAY IRON WORKS





## **MORE TIME** **for cutters to cut—** **with** **GULF MINING MACHINE LUBRICANT**

When you use Gulf Mining Machine Lubricant you can eliminate two or more other lubricants, depending on the type of cutting and loading equipment you operate. At the same time this quality lubricant provides better protection for bearings and gears in underground equipment. The result is more time on the job; less down time for repairs and lubricant application. For additional information on Gulf Mining Machine Lubricant, send the coupon below.

-  1. Less down time—  
better protection
-  2. Less handling—  
fewer lubricants
-  3. Fewer applications—  
reduced leakage



**Gulf Oil Corporation • Gulf Refining Company CA**  
 719 Gulf Building, Pittsburgh 30, Pa.

Please send me without obligation, a copy of your pamphlet  
 "Gulf Mining Machine Lubricant."

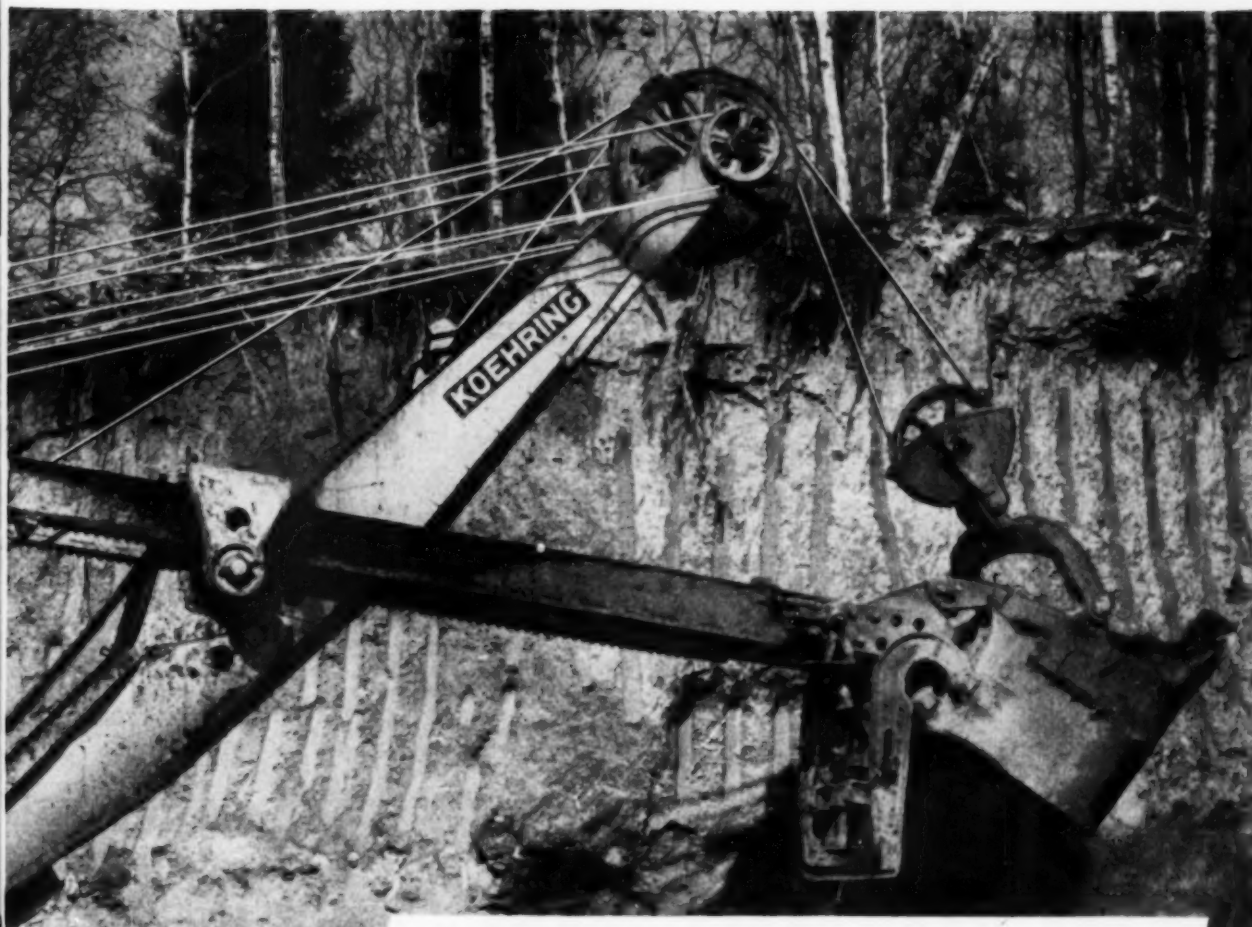
Name

Company

Title

Address





**Get all the facts on  
"KOEHRING WORK CAPACITY"**

**With any shovel or crane, all mechanical features, operating advantages, speeds and capacities add up to one deciding factor . . . cost per yard moved or ton lifted. To make sure you get the biggest profit advantage in excavators and cranes, get all the data on "KOEHRING WORK CAPACITY". For specific facts and figures, see your Koehring distributor soon.**

K220

**KOEHRING Company**

**MILWAUKEE 16, WISCONSIN**

**Subsidiaries: Kwik-Mix • Johnson • Parsons**



## Get the Track that's ahead of the times

This is a good example of track installed with an eye on tomorrow as well as today. The mine where it's laid has plenty of heavy traffic—heavy in volume, heavy in tonnage. But next year, and the year after, traffic may be heavier still; so the mine owners specified track that will handle anticipated needs for a long, long while.

It's a Bethlehem prefabricated job, and the photo doesn't deceive you. That's pretty big rail; the accessories are big and heavy too. Despite the crushing weight of the motors, cutters, and loaders—and

cars that are filled to the brim—the track stands up without a whimper. As mentioned above, it's designed for even greater loads and higher speeds than it's called upon to handle now.

This, it seems to us, is a point that every mine should consider when installing new trackage. Over the years, mining equipment has increased in mobility—and also in weight. It may well become even heavier in future years. So why not let Bethlehem design you a track system that looks ahead, that *is* ahead of the times in every respect?

Any such layout will consist entirely of Bethlehem prefabricated track, and it will be figured for your individual mine. Rails will be cut to the proper lengths, curved to the proper radii; crossings and turnouts calculated exactly and built with precision. Everything will be complete, down to the last brace and joint bar.

Ask for the full story. There's plenty to tell, and a Bethlehem engineer will be glad to discuss the details with you and your staff.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation  
Export Distributor: Bethlehem Steel Export Corporation*



## **BETHLEHEM PREFABRICATED TRACK**





# ROCK IRATED!

for the  
hardest years ahead

Your profits depend on the strength and speed of loading equipment — and P&H gives you more of both.

P&H greater strength comes from welded alloy steels — the toughest construction known. No wonder P&H can take pounding and shock loads that K.O. less rugged machines.

P&H greater speed comes from Magnetorque® Electric Swing — actually 15% to 25% faster than any other machine of its size to give you greater production, lower tonnage costs. And it's goodbye to maintenance and replacement problems for years to come . . .

Magnetorque lasts the life of your P&H.

But to get fully acquainted with this outstanding producer, let us direct you to a 955-A in action.

If you want bigger capacity, same advanced design, ask about the P&H 1055-A (3½ yd.)

**P&H**  
**MAGNETORQUE®**

Electric Swing puts you  
beyond the "clutches  
of wear"

\*T.M. of Harnischfeger Corporation  
for electro-magnetic type coupling.

**P&H** LARGE EXCAVATOR DIVISION  
**HARNISCHFEGGER**  
**CORPORATION**

4400 W. NATIONAL AVENUE • MILWAUKEE 46, WISCONSIN

the **P&H** Line



TRUCK CRANES



DIESEL ENGINES



POWER SHOVELS



PRE-FABRICATED HOMES



ELECTRIC HOISTS



SOIL STABILIZERS



WELDING EQUIPMENT



OVERHEAD CRANES

# CARDOX

NON-EXPLOSIVE MINING METHODS

THESE 261 MINES

Are Now Using

EITHER CARDOX OR AIRDOX MINING METHODS

## WEST VIRGINIA

American Coal Company.....(3)  
 Ames Mining Company.....(2)  
 Anchor Coal Company.....(2)  
 Brule Smokeless Coal Company.....(2)  
 Carbon Fuel Company.....(2)  
 Clear Creek Coal Company.....(2)  
 Coalburgh-Kanawha Mining Company.....(5)  
 Crozer Coal and Coke Company.....(2)  
 Eastern Gas & Fuel Associates.....(2)  
 Gay Coal and Coke Company.....(2)  
 Gay Mining Company.....(2)  
 Dorothy Gordon Coal Company.....(2)  
 Gull Mining Company.....(2)  
 Hoyman Coal Company.....(2)  
 Island Creek Coal Company.....(2)  
 Imperial Smokeless Coal Company.....(2)  
 Jacob's Fork Pocahontas Coal Company.....(2)  
 Johnstown Coal & Coke Company.....(2)  
 Lafayette Springs Coal Company.....(2)  
 F. M. A. Leach.....(2)  
 Lorado Coal Mining Company.....(3)  
 Nassau Coal Company.....(3)  
 National Mines Corporation.....(3)  
 New River Company.....(2)  
 Pardee and Curtin Lumber Company.....(2)  
 Pecks Run Coal Company.....(2)  
 Peerless Coal & Coke Company.....(2)  
 Peters Creek Coal Company.....(2)  
 Pond Creek Pocahontas Collieries.....(2)  
 Premier Pocahontas Coal Company.....(2)  
 Raine Lumber and Coal Company.....(2)  
 Raleigh-Wyoming Mining Company.....(2)  
 Red Jacket Coal Company.....(2)  
 Richwood Sewell Coal Company.....(2)  
 Ridgeview Coal Company.....(2)  
 Royalty Smokeless Coal Company.....(2)  
 Sycamore Coal Company.....(2)  
 Thermal Fuel Company.....(2)  
 Tioga Coal Corporation.....(2)  
 Truax-Traer Coal Company.....(3)  
 United States Steel Company.....(3)  
 United States Steel Company.....(3)  
 Warner Collieries.....(2)  
 West Gull Collieries.....(2)  
 West Virginia Coal & Coke Corporation.....(2)  
 Weyanoke Coal and Coke Company.....(2)  
 Winding Gulf Collieries.....(2)  
 Wyatt Coal Company.....(2)

## KENTUCKY

Bell & Zoller Coal & Mining Company.....(2)  
 Big Jim Coal Company.....(2)  
 Black Star Coal Corporation.....(2)  
 Blue Bird Mining Company.....(2)  
 Cinderella Coal Corporation.....(2)

Citation Coal Company.....(2)  
 Columbus Mining Company.....(2)  
 Creech Coal Company.....(2)  
 W. G. Duncan Coal Company, Inc.....(2)  
 Eblen Coal Company.....(2)  
 Foursam Coal Corporation.....(2)  
 Harvey Coal Company.....(2)  
 Inland Steel Coal Corporation.....(2)  
 Jewell Ridge Coal Company.....(2)  
 Kentland Elkhorn Coal Company.....(2)  
 Knott Coal Corporation.....(2)  
 Liberty Elkhorn Coal Company.....(2)  
 Marlowe Coal Company.....(2)  
 Mary Gail Coal Company.....(2)  
 Meem-Haskins Coal Corporation.....(2)  
 Smith Coal Company.....(2)  
 Stephens Elkhorn Fuel Company.....(2)  
 Stoker Coal Company.....(2)  
 West Kentucky Coal Company.....(2)

## TENNESSEE

Block Coal & Coke Company.....(2)  
 Reliance Smokeless Coal Company.....(2)  
 Straight Fork Coal Company.....(2)  
 Virginia Harlan Coal Company.....(2)

## PENNSYLVANIA

The Berwind-White Coal Mining Company.....(2)  
 Butler Consolidated Coal Company.....(2)  
 Cambria Clearfield Mining Company.....(2)  
 Charles E. Campbell.....(2)  
 Ebensburg Coal Company.....(2)  
 G. & S. Coal Company.....(2)  
 Imperial Coal Corporation.....(2)  
 Johnstown Coal & Coke Company.....(2)  
 Marco Coal Company.....(2)  
 Moffitt Coal Company.....(2)  
 Morrisdale Coal Mining Company.....(5)  
 Ontario Coal Mining Company.....(2)  
 Pittsburgh Coal Company.....(2)  
 Pleasant Valley Coal Company.....(2)  
 Republic Steel Company.....(2)  
 J. L. Sager Coal Company.....(2)  
 Springfield Coal Corporation.....(2)  
 Weirton Coal Company.....(2)  
 Westmoreland Coal Company.....(2)

## OHIO

Columbia Southern Chemical Corporation.....(2)  
 Dindo Coal Company, Inc.....(2)  
 The Farm Bureau Cooperative Association Inc.....(2)  
 Gem Coal Company.....(2)  
 Hanna Coal Company of Ohio.....(2)  
 Jefferson Coal Company.....(2)  
 Lorain Coal & Dock Company.....(2)  
 Powhatan Mining Company.....(2)  
 Warner Collieries Company.....(2)

CARDOX CORPORATION

# ANNUAL Roll Call

## ILLINOIS

Bell & Zoller Coal & Mining Company.....(3)  
 Blue Bird Coal Company  
 Carmac Coal Company  
 Chicago, Wilmington & Franklin Coal  
 Company.....(2)  
 Deer Creek Coal Company.....(3)  
 Freeman Coal Mining Corporation.....(3)  
 Joliana Mining Company  
 Mid-Continent Coal Corporation  
 Mohat Coal Company.....(5)  
 Edward Mohr & Son.....(5)  
 Old Ben Coal Corporation.....(5)  
 Peabody Coal Company.....(3)  
 Paschirer & Sons Coal Company.....(3)  
 Sahara Coal Company  
 Schull-Moake Coal Corporation  
 Truax-Traer Coal Company  
 Union Colliery Company  
 Wilkins Coal Company

## INDIANA

Enoco Collieries Company  
 Ingle Coal Corporation  
 Linton Summitt Coal Company  
 Pandora Coal Corporation  
 Princeton Mining Company  
 Pyramid Coal Corporation.....(2)  
 Snow Hill Coal Corporation.....(2)  
 Viking Coal Corporation

## OKLAHOMA

Buck Creek Mining Company  
 Davis & Swindle  
 Premium Smokeless Coal Company  
 Reliance Smokeless Coal Company

## COLORADO

Arrowhead Coal Company.....(2)  
 Bear Coal Company  
 Black Diamond Fuel Company  
 Boulder Valley Coal Company  
 Canon Black Diamond Coal Company.....(2)  
 Canon Monarch Coal Company  
 Canon National Coal Company  
 Centennial Coal Company  
 Chandler Coal Company.....(2)  
 Clark Coal Company.....(2)  
 Clayton Coal Company  
 Colorado Fuel & Iron Corporation  
 Colowyo Coal Company  
 Consolidated Coal & Coke Company  
 W. D. Corley, Jr.  
 Domestic Coal Company  
 Dry Creek Coal Company

Graden Coal Company  
 Griffith Coal Mining Company.....(2)  
 Imperial Coal Company  
 Jenkins & Mathis Coal Company  
 Juanita Coal & Coke Company  
 Louisville Lafayette Coal Company.....(2)  
 Minerals Development  
 McNeil Coal Corporation  
 William E. Russell Coal Company  
 Taylor Coal Company  
 Tomahawk Coal Company

## MONTANA

Bair-Collins Coal Company  
 Brophy Coal Company  
 Johnson Coal Company  
 Nies Brothers  
 Northern Coal Company  
 Racci Brothers  
 Sheridan-Wyoming Coal Company  
 Transfer Mine  
 Western Coal Company

## WYOMING

Burnell Coal Company  
 Colony Coal Company.....(2)  
 Ronocco Coal Company  
 Sheridan-Wyoming Coal Company  
 Storm King Coal Company

## UTAH

American Gilsonite Company  
 Peerless Sales Company  
 Hi-Heat Coal Company

## NEW MEXICO

St. Louis, Rocky Mountain & Pacific Company

## ARKANSAS

Smokeless Coal Company

## CANADA

Century Coal Ltd.  
 Lethbridge Collieries, Ltd.....(2)  
 The Monarch Coal Mining Company, Limited  
 Red Deer Valley Coal Company, Limited  
 West Canadian Collieries, Limited.....(2)

## VIRGINIA

Blackwood Fuel Company, Inc.  
 Buchanan County Coal Corp.....(3)  
 Clinchfield Coal Corporation.....(2)  
 Coal Processing Corporation  
 Jewell Ridge Coal Corporation  
 Page Pocahontas Coal Corporation.....(2)  
 Sycamore Coal Corporation

**CARDOX  
 HARDSOCC**

**DRILLING EQUIPMENT**

Complete line of drilling equipment designed  
 to give you the maximum in drilling efficiency.

• BELL BUILDING • CHICAGO 1, ILLINOIS •

## U. S. Rubber Conveyor Belt has a tough angle



**F**OR OVER eleven years the same U. S. Giant Conveyor Belt has been carrying the entire output of a Tennessee mine. The coal is loaded onto the belt down a 30-foot chute. The belt descends a grade so steep that coal cars couldn't negotiate it. The belt is 855 feet from center to center, carries 200 tons per hour at 250 feet per minute. During World War II, it was in operation 24 hours a day, 7 days a week. Despite its eleven years of rugged service, it still is in excellent condition and is good for many more years.

United States Rubber Company engineers have designed thousands of belts for every imaginable type of materials handling. You may be sure they can design an economical, efficient belt system for you. Write to address below.

Product of



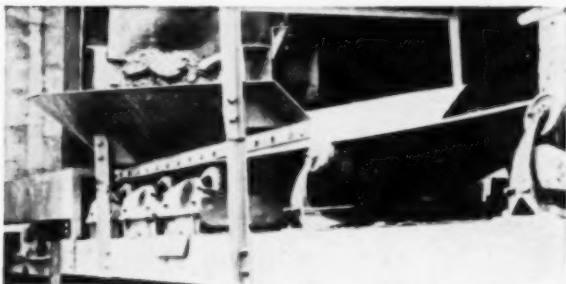
View of loading point at top of tipple.

**UNITED STATES RUBBER COMPANY**  
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.



For long-lived, heavy-duty conveyors . . .

## IT'S TIMKEN... AND TIMKEN...



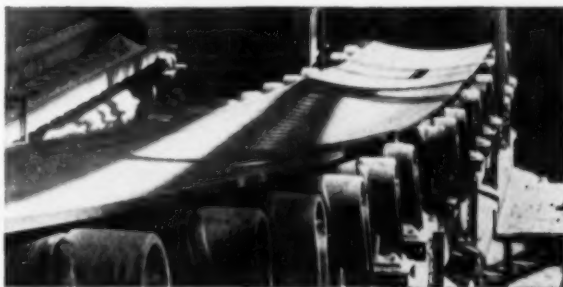
Refuse rock rides 324 feet on this Continental Gin Company conveyor at a mine in Alabama. Rugged Timken bearings in the idlers have given trouble-free service through the years of operation.



Here's a 900-foot Link-Belt Company installation in Pennsylvania, carrying 550 tons of coal per hour to a cleaning plant. Timken bearings reduce friction, assure long idler life, reduce belt wear.

## AND TIMKEN AGAIN!

This Timken bearing equipped Stephens-Adamson conveyor in a South American copper mine handled 90-million tons of ore during an 11-year period. Speed is 600 feet per minute. Load is 4800 tons per hour.



### AND HERE ARE 6 BIG REASONS WHY:

**1 THOROUGHLY PROVED.** The Timken® bearing is the only tapered roller bearing proved by 15 years or more of service in heavy-duty conveyor installations using the popular dead shaft construction.

**2 EXTRA CAPACITY.** Line contact between rollers and races gives Timken bearings high load capacity. And by using Timken bearing sizes that are mass produced for the automotive industry, you get extra capacity bearings that actually cost *less* than the smaller sizes you'd normally use.

**3 LONG-LIFE LUBRICATION.** Not just lubricated for "life" but lubricated yearly, or as conditions require, to insure long life. Fresh lubricant ends any chance of gummy, sticky, jammed bearings.

**4 LONGER ROLLER AND BELT LIFE.** Less sliding and scuffing between idlers and belt.

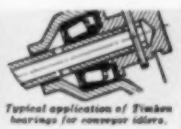
**5 FRICTION MINIMIZED.** Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction.

**6 MAINTENANCE REDUCED.** Long life and dependable performance of Timken tapered roller bearings cut maintenance to a minimum.

Remember "Timken" is not a bearing type. It is a trademark applying only to bearings made by The Timken Roller Bearing Company. Always insist on Timken bearings in the conveyors you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

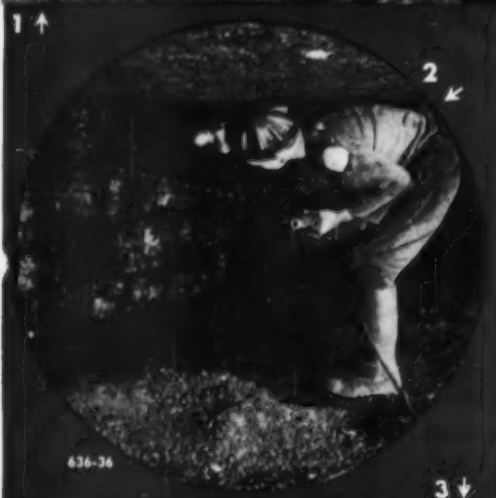
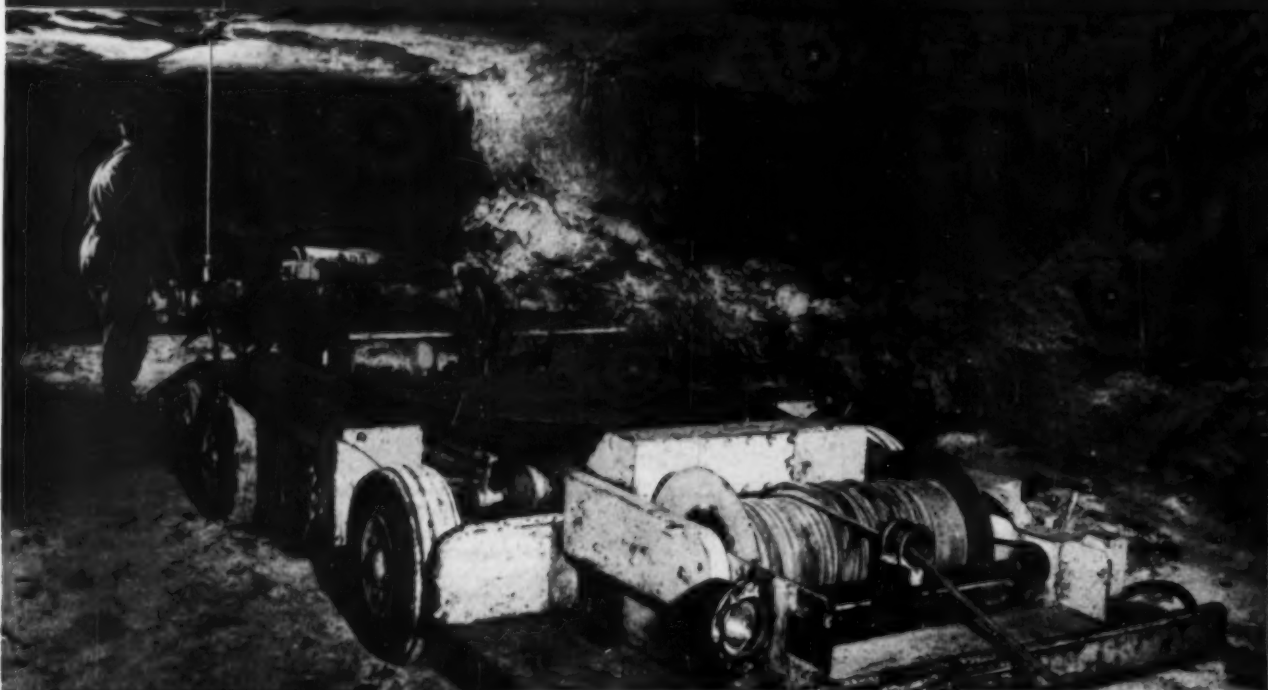
*Wherever the going's tough  
industry turns to*

**TIMKEN**  
TAPERED ROLLER BEARINGS



Typical application of Timken bearings for conveyor idlers.

NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER □ BEARING TAKES RADIAL ○ AND THRUST ○ LOADS OR ANY COMBINATION ○



636-34



244-33

# JEFFREY DRILLS

## COVER EVERY MINING NEED

- 1** Jeffrey Roof Drilling Machine at work with auger in socket and drilling a roof hole. Water is introduced at drill chuck . . . is carried through drill rod to drill bit in the hole. This eliminates dust while drilling.
- 2** Jeffrey A-7 Hand-Held Drill.
- 3** Jeffrey A-6 Post Drill, a popular and widely used unit.



**T**HE ACCOMPANYING ILLUSTRATIONS show various types of Drills produced by Jeffrey to meet the widely different conditions encountered throughout the coal mining industry.

Directly above is the Jeffrey 56-FHR Drilling Machine. Tramming is accomplished by two hydraulic motors and cable reel is also hydraulically operated. The Jeffrey 74-BR., a heavy duty machine, is furnished with either one or two drilling arms. Other models, track-mounted units, are available.

One of the latest additions to the broad Jeffrey line is the Roof Drilling unit shown at the top of opposite page. It not only drills roof holes but provides a torque wrench for anchoring and tightening roof bolts. Straight-line feed for the auger and parallelism to its starting position are maintained by means of cams which shorten and lengthen the Drill Arm and make the required angular adjustments as the drill is fed upward.

Other drilling units are shown also. With this wide range of drilling equipment it is easy to select the right one for the job at hand. Let a Jeffrey engineer help you.

# THE JEFFREY

**MANUFACTURING COMPANY** Established 1877

912 North Fourth St., Columbus 16, Ohio

Baltimore 2	Boston 16	Cincinnati 2	Detroit 13	Houston 2	New York 7	St. Louis 1
Beckley, W. Va.	Buffalo 2	Cleveland 15	Ferry Port, Pa.	Jacksonville 2	Philadelphia 3	Salt Lake City 1
Birmingham 3	Chicago 1	Denver 2	Harlan, Ky.	Milwaukee 2	Pittsburgh 22	

Jeffrey Mfg. Co. Ltd., Montreal, Canada

British Jeffrey-Diamond Ltd., Wakefield, England

Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.

The Galien Iron Works & Mfg. Co., Galien and Bucyrus, Ohio

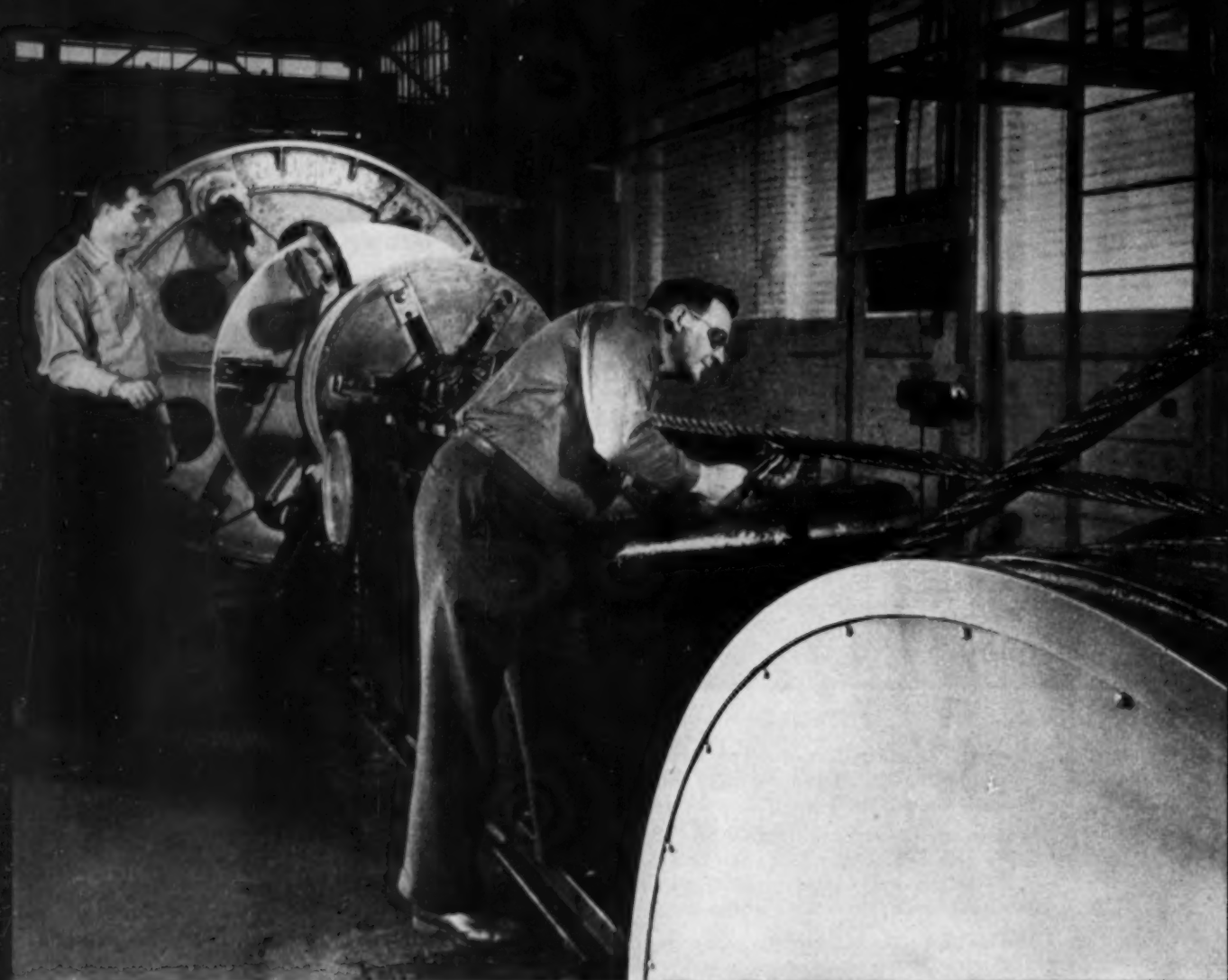
Galion (Great Britain Ltd.), Wakefield, England

The Ohio Malleable Iron Co., Columbus, Ohio

The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

**A COMPLETE  
LINE OF  
MINING  
MACHINERY**





Here a big wire rope emerges from Bethlehem's 66-in. closing machine. At this stage of the checking, the inspector is making sure that the diameter is within specified tolerances.

## He seldom has to say "No"

Saying "no" can be part of the Bethlehem rope inspector's job. Fortunately, he seldom has to use the veto power, for Bethlehem rope is made with such care that rejects are few. But the inspector won't hesitate to stop a rope if even a minor detail is subject to question.

This is merely common sense. But it's also something more. It's the best possible protection for the buyer. It means that the dollars you spend for Bethlehem wire rope will buy what you pay for—a product

that meets the highest standards of workmanship.

In the making of this product, nothing is left to chance. That's one of the reasons why Bethlehem rope is dependable rope . . . the kind that will serve you well in the toughest sort of going.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*

**When you think WIRE ROPE . . . think BETHLEHEM**







*What's your problem?*



**H. Dillingham** of Standard Oil's Evansville, Indiana, office, helped this midwest mine use SUPERLA Mine Lubricants to good advantage. He was close at hand, gave operators engineering service when they needed it.

There's a corps of Standard Oil lubrication specialists throughout the Midwest. You'll find one located near your mine. Through special training and a lot of practical experience, this man has gained a working knowledge of lubrication that can mean real savings for you. To obtain his services, simply contact the nearest Standard Oil office. Discuss with him the savings you can make with such outstanding products as:

**STANOIL Industrial Oils**... Here's one line of oils that provides cleaner operation of loader and crane hydraulic units; supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

**CALUMET Viscous Lubricants**... On open gears and wire ropes, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

## Here's versatile lubrication, plus!

• At a midwest mine, two grades of SUPERLA Mine Lubricants not only have handled successfully a wide variety of jobs but have proved superior in each application to special products previously used.

SUPERLA Mine Lubricant No. 00 has served for over three years in the gear cases and hydraulics of the mine's loaders. Despite hard operation of these machines, there have been no clutch failures, and clutch plates have remained free from carbon deposits. There have been no bearing failures. Hydraulic units have operated efficiently with no downtime for maintenance.

SUPERLA Mine Lubricant No. 4 has been used for over three years in loader gathering heads. On this punishing job, it has prevented any trouble caused by lubricant deterioration or breakdown. Bearing wear has been kept to a minimum.

Shuttle car lubrication and service in a roof bolting drill are among the uses of SUPERLA Mine Lubricants in this mine. The versatility of these products has simplified lubrication and the stocking of

# SUPERLA

REG. U. S. PAT. OFF.

## Mine Lubricants

lubricants. It has eliminated the costly use of special-purpose oils and greases.

You'll find among the six grades of SUPERLA Mine Lubricants the right combination for successful lubrication of your loaders, cutting machines, shuttle cars, and related equipment. The Standard Oil lubrication specialist in your section of the Midwest will help you get the best possible results. You can contact him through your local Standard Oil Company (Indiana) office. Or write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

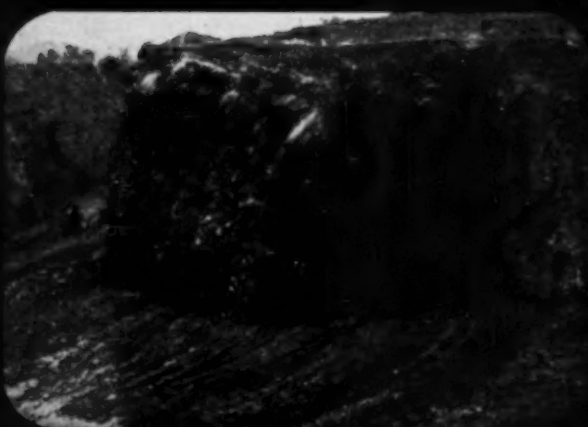


**STANDARD OIL COMPANY**

**STANDARD**

(Indiana)

# Here's how ROCKMASTER<sup>®</sup> blasting increases explosives efficiency



**Y**ou can see ROCKMASTER efficiency in these pictures, taken at the height of four different ROCKMASTER blasts. There is no flying rock, no geysering of explosive force. ROCKMASTER keeps the power of the blast confined, using all the explosives energy to produce maximum breakage with maximum efficiency.

When the blast is initiated at the point of maximum confinement, the explosive force follows the line of least resistance . . . directly into the burden. With ROCKMASTER millisecond blasting, the first initiation places the burden under maximum stress, producing lines of weakness

throughout the burden. A split-second later, the next charge hits the stressed material with a shattering force that produces maximum breakage . . . maximum use of the explosive force. It is the "one-two punch" applied to blasting.

Ask your Atlas technical representative to show you the picture presentation of the ROCKMASTER story. See for yourself how the millisecond delay electric blasting caps teamed with the ROCKMASTER system of explosives choice can give you greater blasting efficiency through complete confinement of the blast.



## **ATLAS EXPLOSIVES**

*"Everything for Blasting"*

**ATLAS POWDER COMPANY  
WILMINGTON 99, DELAWARE**

*Offices in principal cities*



***in WIRE ROPE, too, extra strength  
demands the RIGHT KIND of muscle***

Towering as high as eight feet on his hind legs, the Kodiak or Alaskan Brown Bear ranks as the most powerful animal of North America. Rugged muscle development makes him the feared and deadly fighter that he is.

In wire rope, too, the right kind of muscle is essential to ward off the destructive effects of abrasion, corrosion, bending fatigue, load strain and shock stress.

That's why in Wickwire Rope we make sure—through complete quality control—that you always get the right construction and lay of the rope...the right grade of steel and size of wire for long-lasting resistance to the rigors of your particular service.

See your Wickwire Rope distributor or contact our nearest sales office.



1222

A YELLOW TRIANGLE  
ON THE REEL IDENTIFIES  
WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa  
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane  
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

**WICKWIRE ROPE**



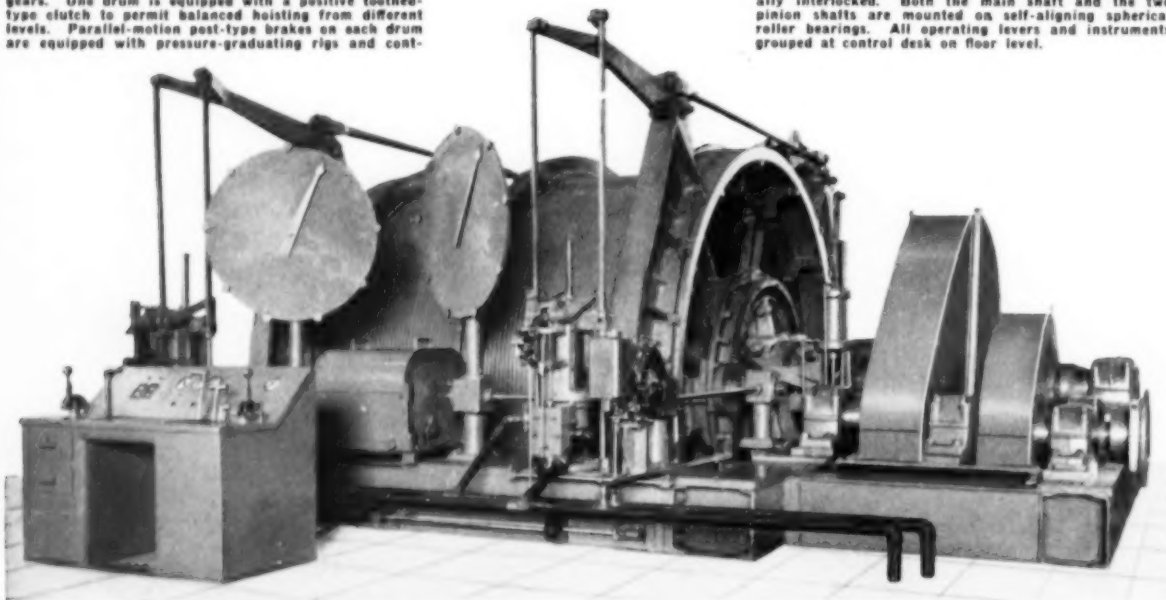
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION  
THE COLORADO FUEL AND IRON CORPORATION



Shop assembly of very modern shaft hoist recently furnished to a metal mine in Australia. 12'-0" x 51" "built-up" all-steel cylindrical drums will be driven by a 600 hp. direct-current motor, with Ward-Leonard ampidyne control, through double-reduction herringbone gears. One drum is equipped with a positive toothed-type clutch to permit balanced hoisting from different levels. Parallel-motion post-type brakes on each drum are equipped with pressure-graduating rigs and controlled

## FOR AUSTRALIA

rolled by modern safety devices which include man-safety feature and automatic throttle shut-off which prevents over-speeding at any point of travel. Brakes and clutch are both operated by oil-hydraulic engines and, on the loose drum, are mechanically and electrically interlocked. Both the main shaft and the two pinion shafts are mounted on self-aligning spherical roller bearings. All operating levers and instruments grouped at control desk on floor level.



# All Over the World VULCAN HEAVY-DUTY HOISTING EQUIPMENT is helping free nations to develop their resources

In this period of international cooperation, when all free nations are striving to increase their ability to resist aggression, we are proud of the important services being rendered by Vulcan engineers and Vulcan products to mining companies throughout the free world.

Coal, Copper, Iron, Lead, Zinc, and many other essential materials are being produced in greater volume today than ever before by the aid of Vulcan Hoists, Sheaves, Cages, Skips, and other heavy-duty hoisting equipment. The modern hoist illustrated and described above is only one of many recently built, or on order, to assure still greater production in the near future.

Write us regarding any present or prospective hoisting requirement. Our engineers welcome opportunities to make helpful suggestions—based on more than a hundred years of successful experience.

## Vulcan Iron Works

ESTABLISHED 1849

Cable Address  
"Vulworks, Wilkes-Barre"

**WILKES-BARRE, PA.**

New York City Office,  
30 Church Street

DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, CAGES, SKIPS, SHEAVES, ETC., CONVEYORS, ROTARY KILNS, DRYERS, ETC., AND ALL TYPES OF MINING LOCOMOTIVES

SEE OUR FOUR-PAGE INSERT IN THE MCGRAW-HILL MINING CATALOGUES.



Each of these three bulletins contains a wealth of specific information. Write for free copies if you can use them to advantage. Fully illustrated.



# *5 reasons why modern mines buy* **Willison Automatic Couplers**

## **1 SAFE**

Willison Automatic Couplers require no manual assistance... no need for men to go in between cars to couple or uncouple a Willison Automatic!

## **2 FAST**

All Willison couplers have the same contour... can be coupled at either end of car or locomotive... no time-consuming reversing is necessary.

## **3 STABLE**

Close coupling of Willison couplers eliminates damaging slack... permits higher speeds with maximum stability... reduces surging and spilling.

## **4 PROTECTIVE**

Two parts, the head and the lock, do all the work on every Willison coupler... take the shocks and strains to protect cars and locomotives from damage.

## **5 PROVED**

Over 50,000 Willisons speed handling and cut costs in mines and industrial plants everywhere. Why not specify Willison Automatic Couplers for your haulage needs?

WRITE TODAY for Folder 5452 for more information on Willison Automatic Couplers. National Malleable and Steel Castings Company, Cleveland 6, Ohio.

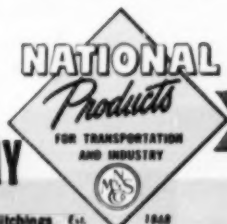
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### **NATIONAL MALLEABLE and STEEL CASTINGS COMPANY**

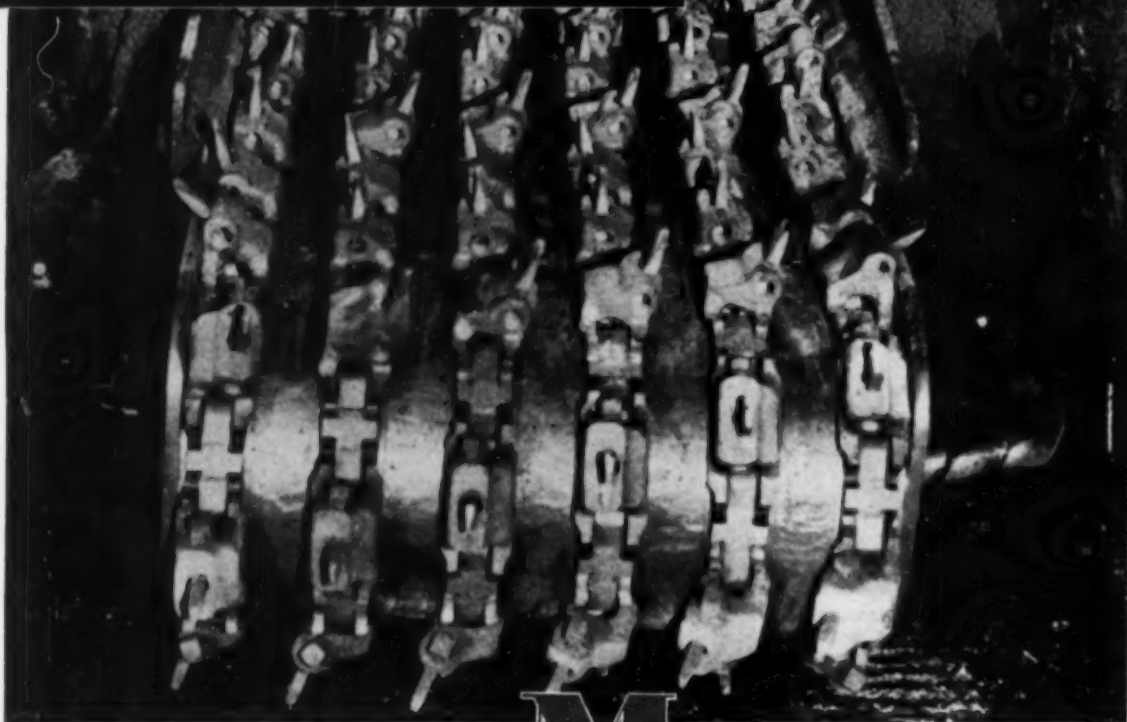
Cleveland 6, Ohio

Willison Automatic Couplers • Friction & Rubber Draft Gears • Car Trucks • NACO Steel Wheels • NACO Steel Links & Swivel Hitchings

Est. 1888



# Another Accomplishment *for* "CINCINNATI MINE"



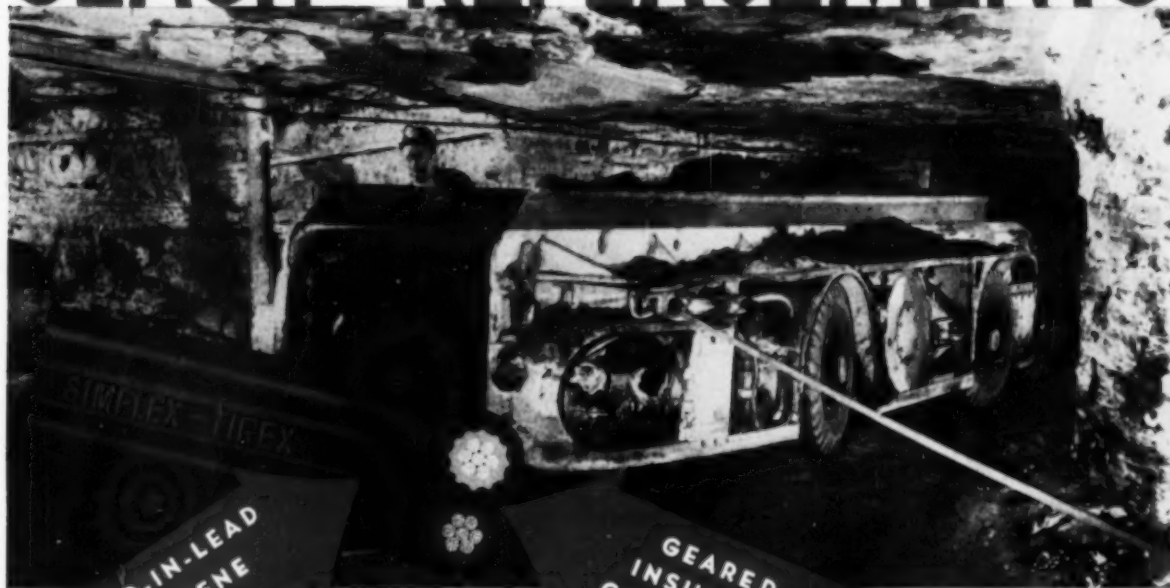
## **C**ontinuous **M**iners...

REACH NEW HIGH IN TOP PERFORMANCE  
WHEN EQUIPPED WITH SPECIALLY DESIGNED  
**TROUBLE FREE CINCINNATI CHAINS**

**O**UR most recent accomplishment is the adaption of the Cincinnati Cutterchain for use on Continuous Miners. Except for some necessary modifications in the bit carrying portion of the cutterchain block, the Cincinnati Chain is basically the same sturdy, long lasting, trouble-free chain that has out-performed all others year after year. Since the failure of a single part of any one of the numerous cutterchains on this machine stops the production of an entire section, it is important to have your Continuous Miner equipped with the most trouble-free cutterchains available...CINCINNATI CHAINS. Write for details.

**The Cincinnati Mine Machinery Co.**  
**Cincinnati, Ohio**

# SLASH REPLACEMENTS



SIMPLEX-TIREX  
CURED-IN-LEAD  
NEOPRENE  
ARMOR

GEARED  
INSULATED  
CONDUCTORS

Your production profits depend upon day-in and day-out performance without shutdowns for repairs. TIREX Shuttle Car Cables will give you this kind of performance by curtailing replacements and lowering maintenance costs.

TIREX Shuttle Car Cable has the only insulated conductors that are "geared" to firmly interlock with the jacket. The conductors offer exceptional resistance to twisting inside the jacket. They can withstand crushing pressures and the continual strain of reeling and unreeling as the shuttle car moves about the mine.

The famous TIREX neoprene armor is "cured in lead" to offer superior protection against the many hazards of mining operations. It provides abrasion resistance and snagproof service with excellent resistance to acids, grease, oil and flame.

For service that means safety, economy and dependability, specify and get Simplex-TIREX Shuttle Car Cables. They keep down costs and help increase output. Our catalog "Simplex Cables for Mining" will tell you about the many other Simplex cables for mining use. Write for a copy today in care of the address below. No obligation of course.

*Simplex* - WIRES & CABLES

SIMPLEX WIRE & CABLE CO.  
79 SIDNEY STREET,  
CAMBRIDGE 39, MASS.

Again Outstanding DESIGN for New Speed and Economy in Drilling

# Parmanco

MODEL 51 • SELF-PROPELLED • HYDRAULIC  
COAL AND CLAY DRILL

This Model 51, one-man operated drill, adds another unit to the top performing PARMANCO line of drilling machines.

An example of its great value is seen in its ability to drill 2½-inch holes at a speed up to 7 feet per minute in No. 5 coal. It will also handle 4¼-inch augers up to 25 feet in depth.



• Hydraulic Feed • Finger-Tip Controlled • Fluid Motor for Auger Rotation



Above

## New Automatic CUTTINGS SHIELD and GUIDE

Model 51 is equipped with the newly perfected Automatic Drill-Cuttings Shield and Guide. Now blast holes are kept absolutely clean from cuttings. Note in picture how a dam is formed about the blast hole, excluding casual surface water.



4 Jacks and Power Winch optional at extra cost.

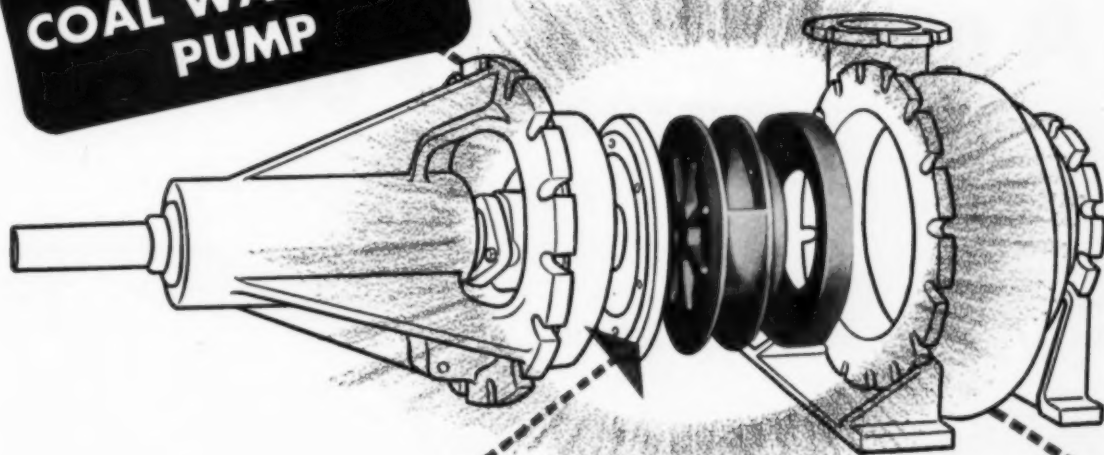
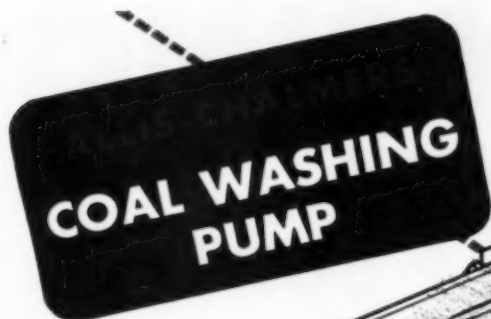


Looking down on New Automatic Drill-Cuttings Shield and Guide located at the right of driver's seat.

Send for  
Complete Details

PARIS MANUFACTURING COMPANY • PARIS, ILLINOIS





## 50% Increase in Impeller and Wear Plate Hardness Gives Longer Pump Life

COAL WASHING PLANT OPERATORS can now expect longer service than ever before from Allis-Chalmers Coal Washing Pumps. Impellers and suction wear plates, parts of the pump receiving greatest wear, have been increased from approximately 400 to 600 Brinell through the use of *Ni-Hard* for these parts as standard equipment at no extra cost. Replacement impellers and suction wear plates for Allis-Chalmers Coal Washing Pumps now in service can be furnished in *Ni-Hard*.

### EASY TO SERVICE

All parts of the Allis-Chalmers Coal Washing Pump are easy to remove and replace. The rotating element can be removed and replaced in a half hour. Parts subjected to varying rates of wear are separated into easy-to-handle sections. Standardization of bearing support bracket parts makes many parts interchangeable between different pump sizes and reduces parts inventory when you operate more than one pump.

### COMPETENT APPLICATION ENGINEERING

Allis-Chalmers application engineers are thoroughly familiar with all types of coal washing equipment problems. Allis-Chalmers can furnish you a complete pumping unit — pump, motor, control and drive — all of coordinated design and manufacture. For help on your coal washing problems, call your nearest Allis-Chalmers District Office. For more information on the A-C coal washing pump with *Ni-Hard* impeller and wear plate, write Allis-Chalmers, Milwaukee 1, Wis. for Bulletin 08B6381.

A-3896



Simple construction. Only five wearing parts: shaft sleeve, impeller, casting, two wear plates. All easy to handle and easy to replace.



# ALLIS-CHALMERS

Milwaukee 1, Wisconsin

# ANNOUNCING

## A new Dodge truck parade of power!



### NEW! More powerful engines!

A parade of power! See the new Dodge "Job-Rated" trucks at your Dodge dealer's today. A total of 7 big, rarin'-to-go engines, including 3 brand-new power plants with high compression ratios and higher horsepower, greater cooling capacity, increased displacement, twin carburetion available on larger models. Plus famous features like 4-ring pistons with chrome-plated top ring, exhaust valve seat inserts.

In addition, the new Dodge trucks offer outstanding new brakes, new no-shift transmission, and over 50 other new features. See your Dodge dealer for the biggest truck buy on record!

For a truck,  $\frac{1}{2}$ -ton through 4-ton  
that fits the job, see the NEW...



### NEW! Extra-powerful brakes!

Stop easily on steep grades, fully loaded. Super-safe brakes give silky-smooth braking, reduced driver fatigue, greater load protection... new increased stopping ability on 1- through  $2\frac{1}{2}$ -ton trucks! **PLUS** Dodge's oversize braking surface with Cyclebond linings.



### NEW! Truck-o-matic transmission!

New Truck-o-matic transmission... available on  $\frac{1}{2}$ - and  $\frac{3}{4}$ -ton models of Dodge "Job-Rated" trucks... saves shifting, cuts driver fatigue, lets you rock out of snow, mud, sand. Only Dodge offers shift-free Truck-o-matic! **PLUS** famous glycol Fluid Drive, to lengthen truck life, protect your load.



### NEW! Over 50 features!

50 ways new! Reinforced cab construction, improved exhaust system, extra-capacity radiators. Tinted glass, heaters with stepped-up heat output available. **PLUS** moistureproof ignition, high-torque capacity starting motors, and other dependability features. See your Dodge dealer.

# DODGE "Job-Rated" TRUCKS

Now on display at  
Your Dodge Dealer's!

*Homocord Conveyor Belt—More use per dollar*

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*Homocord Conveyor Belt—More use per dollar*

*Homocord Conveyor Belt—More use per dollar*

**CUSHIONED THROUGH AND THROUGH . . .** To take the impact of heavy loading. That's why you get more ton-miles of service out of Homocord Conveyor Belt. This resilience withstands the abrasion and gouging of jagged rock, coal and ore. Its flexibility makes it a naturally deep troughing belt that trains easily on the idlers . . . able to haul heaping loads without edge-wear or spilling. Another R/M Conveyor Belt, Ray-Man "F", is designed for underground mining where pulleys are small and great flexibility and tear resistance are needed. Both of these R/M belts give you long life on the job, **MORE USE PER DOLLAR**. Ask the R/M distributor for Bulletins 6906 and 6915. R/M field engineers back him up, to give you **MORE USE PER DOLLAR**—not only in conveyor belts, but in hose, transmission, and V-belts.



MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

**RAYBESTOS-MANHATTAN, INC.**



Flat Belts



V-Belts



Conveyor Belts



Hose



Roll Covering



Tank Lining



Abrasive Wheels

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings  
Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls

# Keep Your Mechanical Equipment With **Rome 60**



Grounding conductor is solidly embedded in Neoprene. This integrated construction provides exceptional protection against "shorts" and mechanical injury . . . maintains flexibility and reduces conductor distortion and fatigue.



Open braid firmly interlocks conductor to tough, all-resistant Neoprene sheath . . . prevents loosening and sheath separation from twisting, bending and pulling.



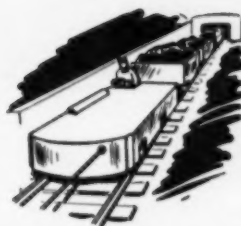
**Rome 60 Line Includes:** Type SO Portable Cords • Single Conductor Locomotive Cables • Concentric Mining Machine Cables • Twin (Parallel Duplex) Mining Machine Cables—Types W and G • Multiple Conductor Portable Power Cables—Types W and G • Shot Firing Cord • Mine Power Distribution Cable • Shovel and Dredge Cables



# on-the-Move

## Mining Cables

Did you ever stop to figure the cost of mining cable failure? . . . the cost in tonnage losses, in man hours wasted, in expensive equipment standing idle? *It's always many times the cost of the cable itself.* That's why we say "It Costs Less To Buy the Best" . . . Rome 60 Mining Cables.



### Single Conductor Locomotive Gathering Cable

Here's the ideal locomotive cable. It offers small diameter and exceptional flexibility. An open braid firmly interlocks the heat resistant insulation to the rugged Neoprene sheath. Strong adhesion between the conductor and insulation is also provided. All combine to assure you of safe, continuous operation and long service life.

Manufactured in full conformity to State of Pennsylvania and Bureau of Mines Safety Codes, Rome 60 Locomotive Cables are marked P-105 BM.



#### INTERLOCKED CONSTRUCTION

—Take a good look at the Parallel Duplex Shuttle Car Cable, illustrated at the left. Note how the open braid around each conductor firmly interlocks . . . actually "gears" it to the Neoprene sheath. This prevents failure from twisting, pulling, and sheath separation. As an extra feature, the heat-resistant rubber insulation offers exceptional overload protection—is suitable for operation at 75° C.



#### MAXIMUM FLEXIBILITY

Now, see how the grounding conductor is separated from the insulated conductors by a tough, highly resilient Neoprene webbing. Result? . . . Maximum flexi-

bility, high resistance to impact, less conductor fatigue, as well as increased protection against "shorts." There are no fibrous "separators" to rot, deteriorate or wick moisture.



#### ALL-RESISTANT NEOPRENE SHEATH

—And now a glance at the Neoprene sheath . . . Molded in lead to a tire-like toughness, it is highly resistant to acids, oils, abrasion and flame. P-105 BM molded in the Neoprene sheath is your assurance of compliance with Federal and Pennsylvania Safety Codes. Depend on Rome 60 Mining Cables to keep the power flowing in—and the coal flowing out.

Copper wire mill products are a controlled material under N.P.A. Controlled Materials Plan . . . USE YOUR CMP ALLOTMENT.

**It Costs Less to Buy the Best**

**ROME CABLE**

*Corporation*

ROME • NEW YORK

—land—  
TORRANCE • CALIFORNIA





*Engineers at Elk Lick  
Coal Company say...* **Belt reinforced with "Cordura" rayon  
trains well under all operating conditions**

**Loaded or empty** this "Cordura" reinforced belt has given trouble-free service since its installation. It is 600 feet between centers. At a speed of 250 feet per minute it carries 100 tons per hour up a 12-degree slope. There has been no shutdown time for take-up of the belt.

The 30" slope belt at the Elk Lick Coal Company, Gerryville, West Virginia, trains well... loaded or empty... under all operating conditions. It was manufactured by Goodyear Tire & Rubber Company on a 5-ply carcass of Du Pont Cordura\* High Tenacity Rayon.

Why do belts reinforced with "Cordura" train better? Here is the simple explanation. Man-made "Cordura" rayon yarn is inherently stronger than yarn of natural fibers. This permits manufacturers to make thinner... yet stronger... belts of fewer plies. *Greater strength with less bulk.* These thinner belts are naturally more flexible, and thus sit more snugly on the center idler, providing better troughability.

Also "Cordura" has the added advantage of making the belt relatively stretch-free.

Find out about conveyor belts made with "Cordura" rayon. We'll be glad to send you the names of suppliers... together with full information about "Cordura." Just write for your FREE copy of the booklet "Sinews for Industry." Address: Textile Fibers Dept., Room 2504-C-1, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

\*REG. U. S. PAT. OFF.

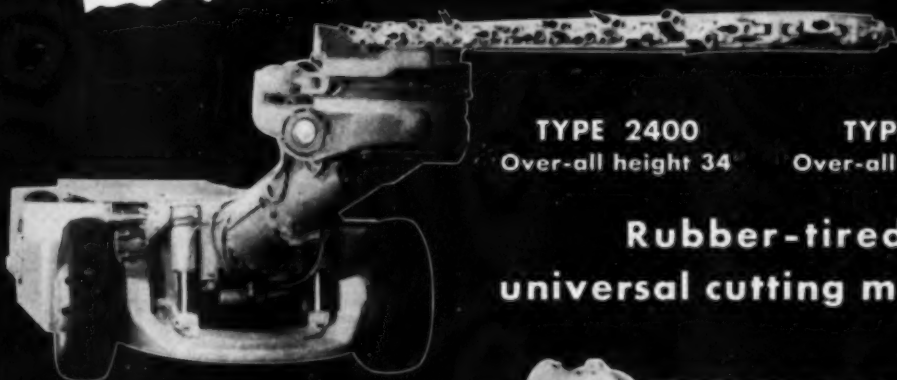
Du Pont *"Cordura"* High Tenacity Rayon  
STRENGTH AT LOW COST



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY



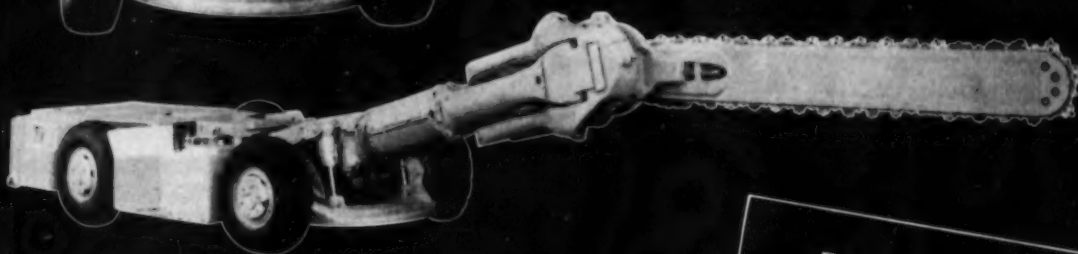
# NEWEST ADDITIONS TO THE GOODMAN LINE OF COAL CUTTERS



**TYPE 2400**  
Over-all height 34"

**TYPE 2410**  
Over-all height 40 1/2"

**Rubber-tired  
universal cutting machines**



Fast cutting, fast tramming machines with the capacity to set the pace for high productive loading units in trackless mining systems.

- ✓ TOP CUTS
- ✓ CENTER CUTS
- ✓ BOTTOM CUTS
- ✓ SHEARS

No blind spots  
from top to bottom,  
from rib to rib

Full hydraulic control . . . Easily maneuvered . . . Wide horizontal cutting range . . . Wide vertical range . . . Dual controls . . . Rugged construction . . . Unit assembled.

\* Over-all height same as that of tires used.  
Larger tires optional.

Your inquiry for complete details is welcomed.

**Goodman**  
**MANUFACTURING COMPANY**  
Halsted Street at 48th • Chicago 9, Illinois

Cutting Machines    Conveyors    Loaders    Shuttle Cars    Locomotives



OFF THE ROAD



ON THE ROAD

# GENERALS

**Resist cuts, scrapes, bruises...  
Give more traction! More speed!  
More safety—**

*WORK FASTER... LAST LONGER... COST LESS*  
**more profit  
for you per job!**

GENERAL L. C. M. Broad, deep, self-cleaning tread lugs and reinforced shoulders for more traction off-the-road. Longer wear on razor sharp mine and quarry surfaces.

GENERAL H. C. T. for most work on-the-road, some off. More rubber, more cords per inch for greater safety. Extra traction through sand, gravel, slush, mud.

**THE  
GENERAL  
L.C.M.**

**THE  
GENERAL  
H.C.T.**

**Make Every Worn Tire Work Longer for More Profit!**

**Your GENERAL TIRE DEALER will KRAFT SYSTEM RECAP Worn Tires with the New GENERAL Truck Tire Tread of Your Choice**



You're throwing away money when you throw away worn tires or accept an ordinary "adjustment" for them. Let your General Tire Dealer—a tire expert—restore worn tires with famous factory controlled Kraft System Recap-

ping. You choose from the complete line of on and off-the-road new General Tire treads and he'll put that tread on your worn tire. He can do sectional repairs too. Get Kraft System Recapping—get more profit from every tire.

**SPECIFY GENERAL TIRES ON YOUR NEW EQUIPMENT**





A gravel pit owner reports ...

**J & L JALLOY**

**"HAD 'EM SKUN A MILE"**

At Left—Walter Stevens holds up J&L Jalloy cutting edge which lasted 2½ years before replacement. Only ¼" thinner than when new.



Above—It takes tough steel to withstand digging material like this!



Above—Walter Stevens rams loader bucket into gravel bank to pick up another load of gravel.

**MAINE STEEL INC. uses  
tough J & L JALLOY**

**to decrease "Downtime" on Hydraulic Loader at H. H. Stevens Co.**

We're pretty pleased with the way Mr. Walter Stevens of H. H. Stevens Sand & Gravel, Gorham, Me., feels about J&L Jalloy.

Mr. Stevens is using a "Straight-Line" hydraulic loader, built by Maine Steel Inc., to load trucks with the sand and gravel from his pit. It's tough work. The loader bucket is rammed into the gravel bank at high speed reverse, which means the severest kind of impact and abrasion on the equipment.

To decrease service interruptions to the work of its loaders, Maine Steel has used ¼" x 6" Jalloy plate for the bucket's cutting edge.

**Here's how Jalloy has worked out—**

Mr. Stevens reports, the first cutting edge of Jalloy lasted 2½ years—loaded 40,000

cubic yards of sand and gravel.

Mr. Stevens sums it up this way. "That blade saved me quite a bit of money."

**And Maine Steel Inc. is pleased with J&L Jalloy too—**

P. J. MacDonald, Maine Steel Welding Foreman, reports Jalloy is no trouble at all to weld using a regular coated rod.

Finally, Mr. G. C. Soule, President of Maine Steel, says that HE'LL CONTINUE TO SPECIFY J&L JALLOY FOR ALL CUTTING EDGES.

Why not write today for our booklet, "For Longer Wear . . . Less Repair." It will give you complete information on Jalloy, plus examples of how other mining and quarrying men are using this modern mining steel to save them money. The coupon is for your convenience.

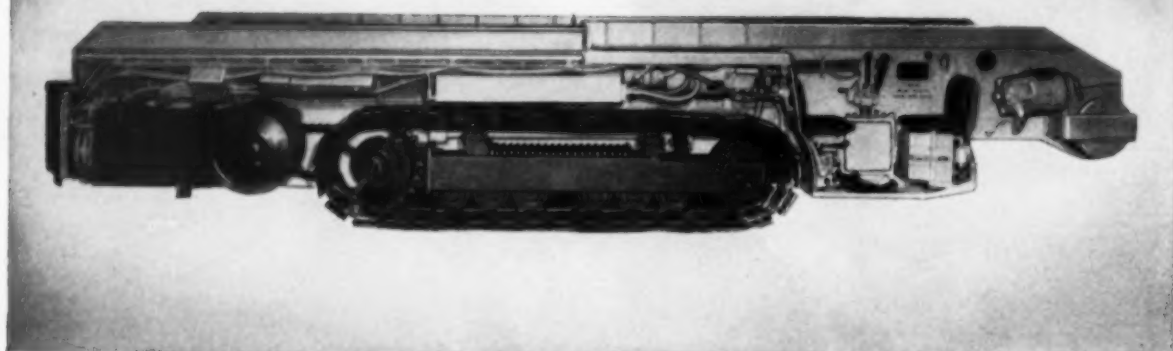
**J&L  
STEEL**

Jones & Laughlin Steel Corporation  
411 Gateway Center  
Pittsburgh 30, Pa.

Please send me a free copy of your booklet, "For Longer Wear . . . Less Repair."

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_

**JONES & LAUGHLIN STEEL CORPORATION PITTSBURGH 30, PA.**



G-E CABLE-REEL SHUTTLE CAR IS HIGHLY MANEUVERABLE, HAS 14-FOOT TURNING RADIUS

## Quantity Production of G-E Shuttle Car Under Way

### Extensive Field Tests Prove Its Versatility, Easy Maintenance Under Rigorous Mining Conditions

Eighteen months ago the G-E cable-reel shuttle car went into service under actual mining conditions to prove its worth. After heavy-duty service under all types of conditions—wet bottoms, narrow passageways, sharp turns—the verdict of operators was enthusiastic. Now, with quantity production under way, you can take advantage of this timely tool for more efficient, economical mining.

#### Crawler Treads Allow Large Capacity

Crawler treads on the G-E shuttle car make possible a wide conveyor, great carrying capacity, and excellent maneuverability either in passageways or at the loading machine. Ground pressure with the empty car is only 10 pounds per square inch. When fully loaded, using sideboards, the car still has only 20 pounds per square inch ground pressure.

Only 42" high, the shuttle car has a carrying capacity ranging from 190 cubic feet to 300 cubic feet (with 12" sideboards). This is approximately 30% greater capacity than is now obtainable with cars of conventional design.

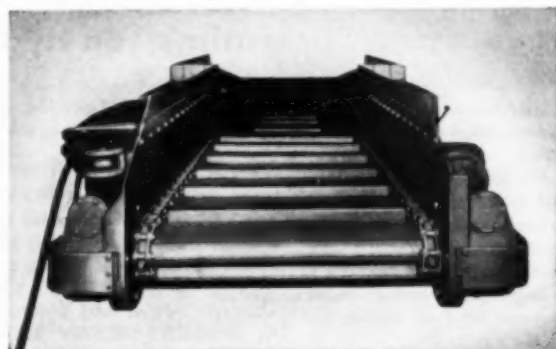
#### Dual Seating Arrangement on Shuttle Car

All motors and control devices meet U.S. Bureau of Mine's specifications. A dual seating arrangement with two conveniently-located control handles permits operation in either direction with maximum visibility and comfort.

Construction of the G-E shuttle car is rugged and *simple* throughout. The two driving motors are readily accessible and easy to maintain. Working parts are easy to get to, easy to service.

Investigate today the many advantages and economies that can be obtained with the new G-E track-laying cable-reel shuttle car. For full information, contact your nearest G-E sales office. *General Electric Co., Schenectady 5, N. Y.*

120-61



End view of G-E shuttle car shows wide conveyor and large carrying capacity made possible by crawler treads.

*You can put your confidence in—*

**GENERAL  ELECTRIC**



## Use Du Pont Iron Wire Caps for more economical, efficient coal production

Designed especially for coal-mine use, Du Pont Iron Wire Electric Blasting Caps have three outstanding advantages:

- (1) *Economy* . . . Iron wire costs less than copper wire.
- (2) *Better visibility* . . . Brilliantly white insulated wires are easy to spot against the face.
- (3) *Easy removal* . . . Magnetic separators readily remove the iron wires from broken coal.

And like all Du Pont Electric Blasting Caps, the Iron Wire Caps have plastic insulation, rubber plugs, and shielded shunts for maximum safety.

You're sure of economical, reliable blasting operations when you use Du Pont Iron Wire Caps in your mine. Contact your Du Pont Explosives representative . . . he'll gladly help you determine the product most suited to your particular needs. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

### DU PONT EXPLOSIVES

*Blasting Supplies and Accessories*



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

**"I always choose my Primacord  
as carefully as I use it . . .**

"I've used Primacord to shoot over-burden, ore, rock — and to ditch and clear right-of-way all-over the country. I get good results every time because I choose my Primacord as carefully as I use it.

"Plain Primacord I put down in small-bore or shallow holes, and also use it for the trunk line to hook them up. It's strong, light in weight, and economical. It's easy to tie tight to make a good connection.

"Reinforced Primacord is good insurance where I'm loading deep holes. It'll carry more weight and has a tougher cover to resist abrasion and cutting.

"Wire Countered Primacord is bound with fine wire. I always use it if I think there's any danger of sharp rocks or heavily reinforced explosives containers cutting the Primacord.

"Plastic Reinforced Primacord has a tough, waterproof plastic cover. I've used it in river crossings, in deep holes, or where field shots must stand a long time before blasting. It will take a lot of punishment, and is not affected by high summer heat or winter cold."



**REINFORCED**

**WIRE COUNTERED**

**PLAIN**

**PLASTIC REINFORCED**

**THERE'S A TYPE OF PRIMACORD  
FOR EVERY JOB**

Type	Shipping Weight		Tensile Strength
	500 ft.	1000 ft.	
Plain	9 lbs.	19 lbs.	113 lbs.
Reinforced	10 "	20 "	160 "
Wire Countered	19 "	35 "	220 "
Plastic Reinforced	12 "	22 "	250 "

Ask your explosives supplier  
or write for further facts to  
**THE ENSIGN-BICKFORD COMPANY**  
Simsbury, Connecticut  
Also Safety Fuse since 1836

**Use PRIMACORD®**

**The PROVED and APPROVED DETONATING FUSE**

P-1



## Can Be Done

SUPPOSE, for example, that a user could get energy from coal at 20c per million Btu's, including freight, ash-handling and all other charges. That sounds like a tall order, because now, except for plants almost on top of the mines, cost to larger users ordinarily is not less than 30c per million Btu's and quite often is 40c or more. If the cost was 20c or less, what would happen? Among other things, fuel oil would have to be delivered at around 3c per gallon on an equivalent basis. Even at 30c for coal, oil would have to be delivered at around 4¼c per gallon, which would present oil competition with somewhat of a problem—and, by the same token, natural gas for other than home use.

But of course, as coal men well know, the problem is not as simple as a straight Btu-price comparison. Oil and gas companies can and do dump, and many consumers go for the convenience and cleanliness argument even knowing that it costs them money, especially if the difference is not too great. But if coal could be provided in large quantities at less than 20c per million Btu's, it seems logical that the coal salesman would have an easier time against competition,

and also that the availability of energy at such a low price would stimulate additional search for ways and means of making use of it. That is the basic reason for stress on reducing mining cost, as well as all other costs that enter into the final cost to the consumer. It is only necessary to consider the present market situation to provide the emphasis.

Is there room for real accomplishment in cutting cost—say as much as a dollar or more a ton, even if 20c per million Btu's to the consumer is a little out of reach for the average operation, at least today? The answer is a definite "Yes!" as the case histories in the following *Coal Age Special Report* on "Cost Cutting Today" show. Costs are being cut—and substantially. The Special Report blueprints ways and means. The key is conscious, concerted effort by every man on the payroll, and especially by all members of the management ranks from the president to the face foreman. The job can be done by studying everything, taking nothing for granted and employing modern methods, equipment and materials to the fullest. Better times for coal men are the reward.

## Here to Stay

WHILE it might be viewed as something in the nature of cold comfort, bituminous coal has experienced a real revolution since World War II and has come out ahead. In other words, it has replaced the 75- to 100-million ton loss in the railroad field, primarily with utility business, and today, even at the reduced rate of 1952, is a bigger industry than in the five prewar years of 1937-41. Incidentally, the gas-turbine locomotive is definitely on its way in the railroad field, though not yet burning coal. The Union Pacific reports good results with six of an original order of ten already in service, and has placed an order for 15 more. This can definitely be considered as paving the way for the coal-fired unit.

The preceding and other evidence continues to show that coal men and coal companies can move ahead against everything that competition can throw at them. For instance, The Carbon Fuel Co., of Charleston, W. Va., is celebrating its 50th anniversary this year. Its history is typical of the progress that many companies have made over corresponding or longer periods against odds that at times seemed almost insurmountable. And in this issue *Coal Age* presents the careers of seven company heads who have served the industry well and ably for 50 years or more. When it's all added up, one can conclude once again that coal is here to stay—and for many productive years yet to come.

## Who's Who—and How—in Cost-Cutting

### THE MAN

### THE JOB

President	}	Emphasize cost-cutting.
Vice President		Develop clearcut policy.
General Manager		Provide efficient equipment.
		Provide competent management.
Comptroller	—	Keep and analyze cost data.
		Provide necessary reports.
General Manager	}	Provide competent supervision.
General Superintendent		Analyze costs.
Superintendent		Analyze operating practices.
Chief Engineer		Keep good production records.
Electrical Engineer		Provide efficient services — transportation, power, maintenance, ventilation, drainage, etc.
Mechanical Engineer		Check supply purchase and use.
Mine or Pit Foreman		Investigate new methods and equipment.
Tipple Foreman		Keep in personal touch with mine operation and supervisory personnel.
Outside Foreman		
Chief Electrician	}	Keep machines producing at maximum capacity by providing good power and efficient maintenance.
Master Mechanic		Promote economical use of supplies.
Maintenance Foreman		
Section Foreman	—	Make operating plans effective.
		Suggest improvements in practice.
		Promote economical use of supplies.
		Use equipment properly — prevent abuse.
		Promote effective maintenance.
		Foster good employee relations.

# Cost Cutting Today

## What's Needed . . . How to Do It

*"Can we cut our cost, say, a dollar a ton?"*

Have you, as superintendent, president or other top official ever consciously asked yourself that question—and then set out to see if you could make the answer a fact?

*"Can I work things so I can get a couple of cuts more per shift?"*

Have you, as a face supervisor, ever consciously went at your job in that fashion?

COAL'S PRESENT POSITION makes these and similar questions that might be addressed to themselves by all other men charged with mine operation of vital importance. There is no need to look farther than the recent wage increases, and the decline in demand the industry is now experiencing—temporarily, it is to be hoped—to find good reasons for this statement. The companies—and the men—that want to stay in business and earn a good living must keep cost-cutting in all its phases as their No. 1 job.

Are a dollar per ton or two cuts per shift, to repeat the preceding examples, unrealistic goals? In some instances they may be. In others, it may be possible to do even more. Investigations in the field in preparation for this *Coal Age Special Report* have uncovered instances where companies with conditions and equipment very similar to those prevailing generally in the industry have been able

to cut cost more than a dollar per ton. All the evidence indicates that there still is a real opportunity for getting cost down at practically all mining operations today—provided the proper steps are taken.

### What Can You Do?

The first and most-basic step of all in attaining the lowest-possible cost is a simple one: Put it first in your thinking. Cost-cutting is very much a state of mind—an attitude that takes nothing for granted and is continuously directed at doing everything possible to raise efficiency, heighten quality and enhance safety. To cut cost, there must first be a resolve to do it—and to never forget that is the first order of business.

Of equal importance, too, is the realization by every man in the organization—miners and management

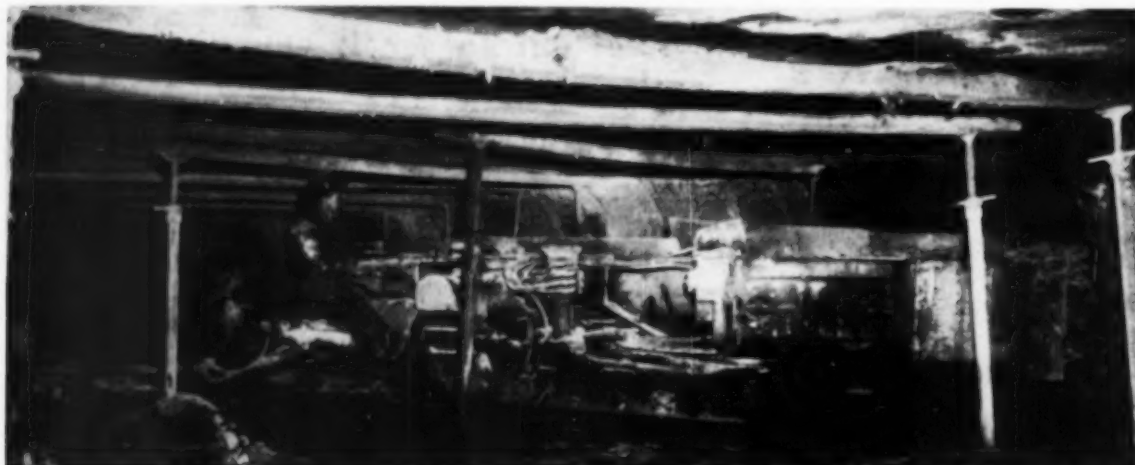
alike—that cost-cutting is not "penny-pinching." You can call it "penny-watching" or "penny-pushing" if you like: Penny-watching to make sure that no unnecessary or unjustified item of operating cost continues on the basis that it has always been done that way or that it seems the easiest and most-obvious way of getting the job done; penny-pushing to insure that you're receiving every possible bit of productive capacity you are entitled to from your machines, the labor you employ, and the brains of your management.

Ingenuity and perseverance are the keys. Suppose, for example, that the average current realization on your coal is \$4.60 per ton and that at that figure the net operating profit is 20c per ton. The mine ships 2,400 tpd and employs 180 men, for an output of 13.3 tpm. If there were three working sections, each with 18-man crews averaging 13 cuts at 30 tons per cut,

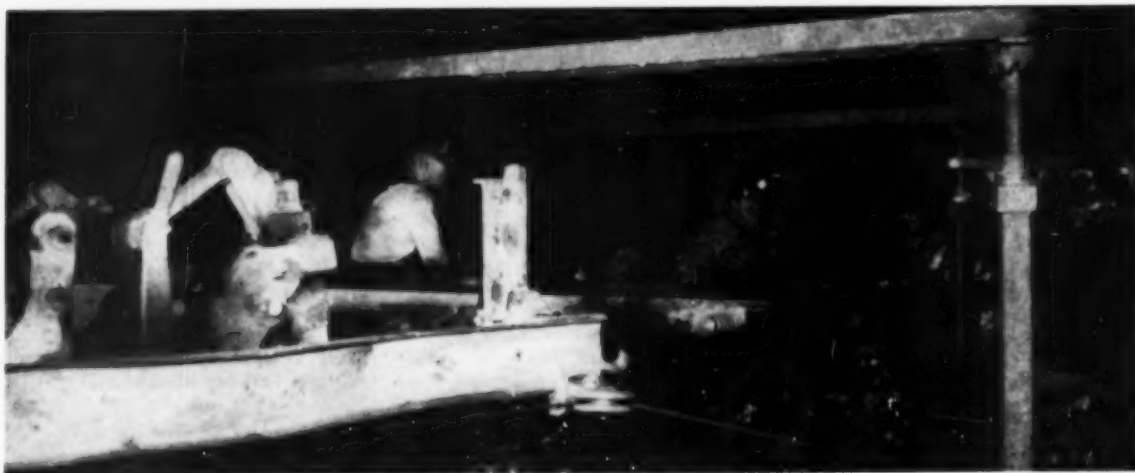
## COST CUTTING TODAY . . .



**SPEEDY DEVELOPMENT** with a low-type continuous miner served by shaker conveyors saved \$71,000 and prevented closing the mine for a Washington company operating on a 9 deg pitch in the Plant No. 6 seam (CA—Aug., 1952, p 71).



**APPLICATION** of continuous miners followed by pickup loaders raised productivity from 4.44 to 8.65 tons per man-day and improved roof conditions for a company working in a 5-ft seam of Alabama coal (CA—June, 1952, p 76).



**OVER ONE-THIRD INCREASE** in production resulted from changing the mining system from 300- to 2,000-ft rooms at a conveyor mine operating in 38-in coal. In addition, the usual development period was eliminated (CA—June, 1951, p 76).



average unit output would be 400 tons per shift and tons per man at the face would be 22.2.

If the methods you could work out to increase production in your section two cuts per shift could be extended to the entire mine, the addition to the daily output would be 360 tons, with little additional cost except for supplies. Output per man for the total payroll would be raised 2 tons, representing a real saving.

Consider some of the smaller things in relation to net operating profit. If one cutter bit at \$1.10 could be saved per cut by preventing its actual loss or its destruction by improper use, total saving in your section per shift would be \$14.40 on the basis of 13 cuts. That \$14.40 is equal to the profit on 72 tons of coal at 20c per ton.

Every 15 min you can knock off a repair job in your shop means, at 20c per ton, the profit on 3 tons of coal at today's wage rates. And if two or three men are involved, the saving is multiplied accordingly. In the tipple, the foreman who can increase recovery 1 or 2 percentage points, or can reduce labor by one man-shift or more by better maintenance or better planning, is "mining" more coal for his company. On this basis, saving 20c worth of equipment, supplies or labor

anywhere on the property is saving the profit on a ton of coal.

Consider your cost-cutting efforts in terms of net operating profit and you can appreciate how things—even seemingly small—can add up. Looked at in that way, cost-cutting is a creative effort. It can build prosperity and expansion for the company—and for the men that work for that company. Cost-cutting requires imagination, a fresh approach, a critical eye, a definite determination and, even, a certain boldness of mind. Every management man who looks at his job from that viewpoint can contribute effectively and realistically to the progress of his organization.

### What Is the Job?

With the proper psychological climate established, these things naturally are next in cost cutting:

1. Establish a goal to be attained, whether a dollar a ton or whatever figure a careful study of the possibilities indicates is feasible. The goal, of course, is subject to revision as developments in methods and equipment make it possible.

2. Study each phase of operation, missing nothing from front office to the face, to see how it can be tightened up and improved.

3. Bring everybody into the act. Concerted effort by all concerned is the effort that pays off.

The directions cost-cutting can take are, as indicated, as numerous as the functions involved in mining, with personnel and investment to save money as additional critical factors. Thus, in addition to men well-versed in their jobs and money for cost-saving devices and materials, cost-cutting takes in, among others, these things:

1. Type of equipment.
  2. Mine layout.
  3. The face cycle.
  4. Transportation.
  5. Safety.
  6. Preparation.
  7. Services—engineering, power, maintenance, ventilation, pumping and drainage, supplies and so on.
  8. Elimination of overtime and reduction in travel time.
  9. Job methods—efficient ways of doing work.
  10. Work standardization—the establishment of realistic goals for production and cost.
- More detail on this grassroots approach to cutting cost is the subject of the following sections of this *Coal Age Special Report*. The case histories prove that it pays off.

## I. Spend Money to Save Money

Installation of a new-type vertical drill, costing around 2½ times the models previously available, provided these benefits for a leading strip-mining company:

1. Replacement of three vertical drills and one horizontal unit.

2. A saving of 100 lb of explosive per hole because the cuttings provided by the new drill were ideal for stemming purposes.

3. Better breakage of the bank and higher yardage per strip unit.

The preceding case history—and

many others that might be cited in both deep and strip mining—points up the fact that, paradoxical though it might seem at first glance, one of top management's chief responsibilities is spending money. Unless it does spend money for new equipment and facilities—wisely, of course—it cannot attain the goal of lowest-possible cost of operation.

Investment to conserve manpower is of course the prime investment from the payoff standpoint. That means in turn the use of machines for every possible operation in and around deep

and strip mines, including, even, payroll preparation and record-keeping in the office. It also means readiness to replace existing machines when new models with higher capacity or other features provide appreciable savings in labor or otherwise after taking into account junking the remaining investment in the older machine and the higher cost of the new.

Along with equipment, management benefits from proper investment in supervisory manpower, both in numbers and compensation, and in training supervisors to do a better job.

## II. Develop Manpower Efficiency

Leaders in their fields in efficiency and safety include, in eastern Kentucky, one company that has benefited by past training of foremen to make them cost-conscious. Now, these foremen are being trained to be profit-conscious.

Five positive steps to develop better supervision that have paid off for an Ohio company are:

1. Creation of enthusiasm among foremen by giving them recognition for work well done.

2. Rating performance of each section monthly; giving each foreman a monthly evaluation of his performance.

3. Permitting the mine superintendent to operate his property with a minimum of outside control. "Bu-

reaucracy is not good, whether in industry or government."

4. Promoting from within the organization.

5. Providing an industrial-relations specialist to advise superintendents in labor disputes.

To remain healthy, the coal industry must have men who are (a) bas-

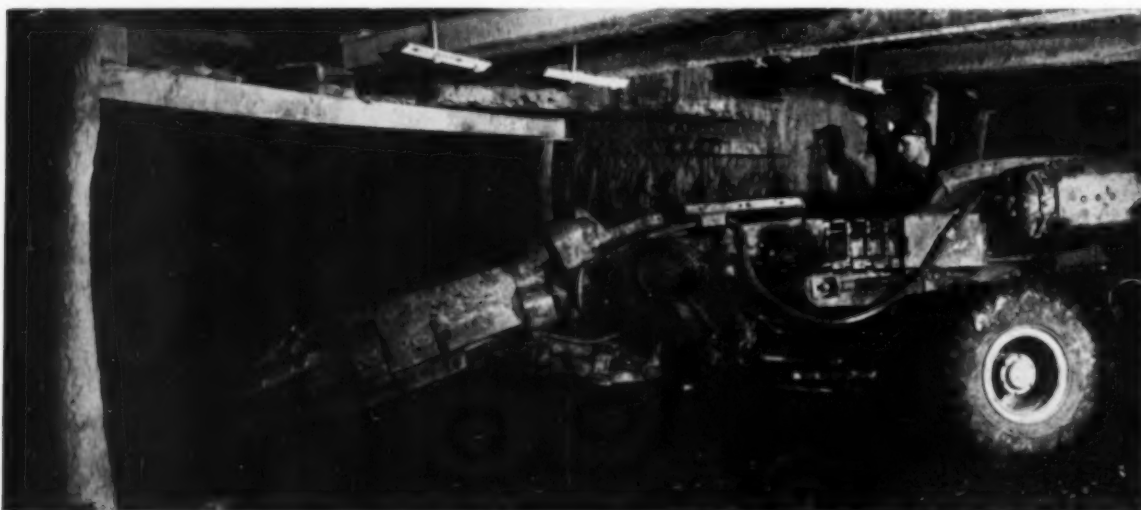
## COST CUTTING TODAY . . .



**PRODUCTION** per loading crew was increased 70 tons by replacing track units with crawler-mounted loaders and shuttle cars (CA—May, 1950, p 70).



**ROOF BOLTING** permitted installation of mobile off-track equipment, raised productivity 50% and gave better control over extremely bad roof (CA—Sept., 1951, p 86).



**CONVERTING** track-mounted loading machines to rubber-tired units, permitting off-track mining, raised productivity 50% and saved heavy capital expenditure for a northern West Virginia mine (CA—March, 1951, p. 92).

ically intelligent or competent, (b) capable of handling other men, (c) have a desire to be leaders, (d) have a desire to learn, and (e) are ambitious. In addition, the industry must be interested in their development and supply them with the tools to reach their goal. There are several approaches to the problem, all of which may ultimately develop the proper type of supervisor. Here are points most authorities generally agree should be checked in developing a good supervisory group:

**Give Them Recognition**—All employees, whether supervisors or not, like to receive recognition for the work they perform. It is especially important that supervisors be given credit

for their part in the production of coal. Recognition may be in the form of a word of praise from a supervisor, a letter expressing appreciation for their part in making a success of a particular project, a statement in a company publication, a financial reward or some other symbol. The important thing is that they be recognized for their part in producing coal.

**Give Them the Facts**—Many supervisors are handicapped because they do not know enough about company policy, costs and the reasons why certain things are done. While it is not necessary or prudent to give them confidential information, it is good management to give them enough so they can counteract false statements

and rumors that always arise among the men working under them. A well-informed supervisor is a confident and poised supervisor.

**Train Them**—Ambitious, intelligent supervisors are eager to learn more about their jobs and other phases of the mining industry. By establishing night classes, discussion groups and on-the-job training, many companies have developed better bosses, and therefore better-managed operations. Compulsion should not be associated with any type of training or educational program. Rather, the companies should sell the idea of how the plan will aid the supervisor in doing a better job with less effort. The alert, ambitious supervisor will be looking

for ways to improve himself. The company must provide the facilities for him to do so.

**Give Them Incentives**—A goal to shoot for and a reward for achieving the goal stimulates the supervisor to do his best and improve present performance. In other words, let the supervisor have some goal or objective established for him and then reward him when he reaches this goal. The reward may be in the form of money or simply a letter from his superior expressing appreciation for a job well done, depending on the circumstances. Without some sort of goal, the average supervisor will become static and accept present performance as his best.

**Select the Right Man**—Don't put square pegs in round holes. Examine each man and his abilities so each will be performing the job for which he is best suited. Any supervisor must be able to understand the language of the men working under him. One man may be able to supervise a certain type or group of men, such as a construction crew, and not be able to

supervise another, such as an underground crew. For the best results, put the round pegs in the round holes and the square pegs in the square holes.

**Check Supervisor Performance**—After men have been put on a job do not accept their placement and performance as the best possible arrangement. At best, some of the round pegs will develop edges and some of the square pegs will become rounded. Continual re-examination of all supervisors will indicate if and when further changes must be made.

Some companies make the mistake of relying on a few opinions in evaluating performance. A larger group, say, five or six, should rate performance according to a definite plan. For example, the group should weigh the following factors in evaluating a supervisor:

1. *Skill*—application of knowledge to the job.

Does the supervisor have the training and experience necessary?

Does he have the ability to analyze problems arising on his job and take steps to solve them without too much outside help? Does he possess the per-

sonal characteristics the job needs.

2. *Responsibility*—how much is involved?

Does he possess the leadership to organize and supervise men under him? How much responsibility does he have for items effecting cost?

Does he possess the accuracy and dependability required for the job?

3. *Application*—what degree is necessary?

What degree of mental and physical application is necessary?

Does the supervisor have the degree required?

**Make Them Cost-Conscious**—Unless a supervisor is aware of production cost and what goes into the figure at the bottom of the chart, he cannot do his job intelligently. It is asking a minor miracle to expect a foreman to be economy-minded if he does not know what it costs to produce a ton of coal, how the cost sheet is broken down, and how much is spent for each item. If the supervisor is well-informed, he can be alert for ways to reduce cost. If he is given the figures he can do the job.

### III. Analyze and Act

Effective action in cutting cost is a product of thorough study of the situation followed by action accordingly. This process, at an eastern Kentucky operation led to these steps to higher efficiency:

1. Proper balancing of wide work and development.

2. Grading of entries during good-work periods.

3. Use of wood bolts instead of steel in short-lived places to cut roof-support cost.

4. Installation of larger locomotives to reduce maintenance costs on haulage units.

5. Elimination of overtime except for emergencies.

6. Replacement of small mine cars with new high-capacity units.

7. Employment of an industrial engineer to study office procedure. The result: elimination of useless reports and unnecessary workers.

A West Virginia company found these, among others, profitable:

1. Installation of higher-capacity equipment to permit full-seam mining and greater production per crew.

2. Installation of new preparation facilities to handle the full-seam product and eliminate second-shift tippie operation.

Another West Virginia operation did this:

1. Saved \$1.28 per ton by improving face preparation, including air-breaking to increase yield of more-profitable sizes and provide other benefits.

2. Saved an additional 8c per ton by adopting hand-held hydraulic drills powered from cutting machines, eliminating two-man drill crew.

A profit of 75c per ton was earned by another West Virginia company by augering areas that could not be mined by conventional methods. The company also saved 15c per ton on regular production by improving face preparation. Still another West Virginia operation benefits by keeping nonproductive personnel to a minimum and assigning several functions to staff members where possible, eliminating non-working jobs.

Steps taken by an Ohio company to cut cost have included:

1. Driving a new slope to reduce travel time.

2. Mechanizing offices and warehouses to eliminate nonproductive workers.

Improving the mining operation, as these case studies indicate, is a job of studying the operation in full and in detail. Such a study may be broken down into the following classifications:

1. Face or loading operation.

2. Transportation and general inside.

3. Tipple performance and general outside.

#### TIME-STUDY FOR FACTS

Any or all of the operations involved in mining, whether deep or strip, may be out of balance and yet, without careful study, may appear satisfactory. Time studies made by a competent person are the best approach to the problem of arriving at the right answer. They will present the facts in a concise, accurate manner, and will reveal any unbalance in the operation.

Swing recorders on stripping units, particularly the larger ones, are a form of time study, since they show when the unit is losing time and permit changes to be made to remedy the situation. Or a loading shovel may have to do extra maneuvering that might be eliminated by studying the situation and devising a new loading plan.

In a deep mine, it may be found



## COST CUTTING TODAY . . .



**AUGER MINING** with 42-in diesel-powered unit produces up to 500 tons per shift with 4-man operating crew in northern West Virginia. Successful application in this field adds continuous-type mining to strip operations (CA—May, 1952, p 71).



**PARALLEL-TANDEM** stripping system with high-capacity equipment provides full work time for both units and permits economic removal of thick overburden containing soft material for an Indiana strip operator (CA—Sept., 1951, p 84).

that a section producing 250 tons per shift with high-capacity loading machines could be producing 350 tons per shift if adequate preparation facilities were available, such as, a longer cutter bar or a mobile drill with power positioning and modern feed. Each element in the face operation should be gone over with a fine-toothed comb and changed if necessary so that, as an example, the capacity of each unit is matched with the capacity of the loading equipment. Should delays be uncovered arising from human limitations, machines or power-operated units are in order.

Time studies may reveal a misapplication of equipment and point up the need for re-equipping the area in question. In some instances, it may pay to convert from track to off-track equipment, or install new types of conveyor equipment to achieve a satisfactory cost.

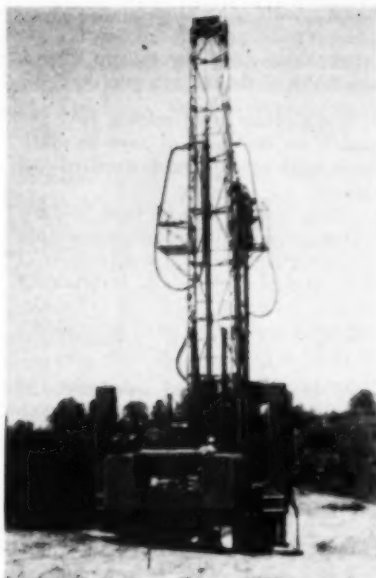
Time studies also may reveal some weaknesses in the mining method or plan. For example, a loading machine may be spending too much time in a pillar because of bad roof encountered after a lift is, say, three-fourths through. One obvious solution is to cut down the size of pillar so that

it can be extracted before the roof deteriorates. If mine cars and track are employed there may be too much time between changes because of a poor layout requiring a locomotive to travel too far in making the change. Loop haulage or changing switches as close as possible to the working faces are some of the solutions.

### **ANALYZE TRANSPORTATION**

Haulage in the end determines how well the production units function, whether in deep mining or stripping. Inadequate roads in stripping, for example, either limit the loading rate





**ROTARY OVERBURDEN DRILL** sinks blastholes at high speed. Air flushes hole, reduces bit wear and eliminates need for water (CA—Feb., 1951, p 112).

or require additional equipment and labor to move the coal.

The same is true in deep mining. If the transportation system consists of track and cars, the trouble source may be any one of the following: poor track, poor power, insufficient or too-small cars, too few sidetracks, poor dispatching or too many cars tied up with refuse and supplies. A belt conveyor may be too small or running too slowly to carry all the coal that could be produced. Two possible courses of action are moving some of the productive equipment to another area or installing a higher-capacity belt, aside from changing the drive for more speed. In shaft mines, the limiting factor may be the size of the shaft or the capacity of the hoist.

While changes involve substantial capital expenditures, many companies have found that they pay off, provided the remaining coal reserves warrant the expenditure.

#### **CHECK TIPPLE PERFORMANCE**

Tipple delays generally are not given their due consideration in coal production. Uniform feed at or near capacity is far superior to the variation in feed often present when the tipple delays the underground and an eager foreman operates the plant far above rated throughput to help the underground men. Variations in the cleaning-plant rate often result in confusion in operation and a nonuniform product. Overloading also puts an extra strain on the tipple equipment

and may cause it to fail at a critical time, with even-greater loss of production.

#### **KEEP UP-TO-DATE MAPS**

A currently-posted mine map is of great value in planning operations, equipment moves and the like in either deep or strip mining. One method of keeping the underground map current is to have each section foreman mark his daily progress with a colored pencil. For best results, the color should be changed each week. A similar arrangement can be employed in keeping strip maps up to date. Tacks in various colors are helpful in showing locations of equipment, loading points, haulage routes, sidetracks, changeout switches, pumps, substations, telephones, fans and so on.

#### **SPECIALIZE WHEN NEEDED**

Increased labor costs have brought many companies operating old mines, especially in the deep category, face to face with the problem of increasing production from areas where considerable deadwork is necessary to get new working places ready. In many instances timbering, rock work and tracklaying have been done by the section crews during regular production hours at the expense of coal tonnage.

One solution to the problem of more tons per crew under such circumstances is to have the section in such shape that there will be no deadwork. One way of doing this is to have a third, or offshift, cleanup crew perform the work necessary to put the production crew in position to load in a normal manner. In addition to cleanup work, the offshift crew can load enough coal to pay their wages. Regular crews will increase their production because they are free to concentrate on loading.

## **IV. Check Cost Constantly**

An Ohio organization, in addition to the normal followup methods, does these two things to keep better track of costs:

1. Provides a statistician to consult with superintendents on cost problems.
2. Provides superintendents with all possible engineering and accounting services.

Daily scrutiny of the cost sheet and analysis of each item for each section of the mine is basic in cost reduction. A daily cost sheet should be issued to the superintendent and mine

foreman so they can analyze daily not only the total figure at the bottom of the sheet but each of the components with the thought of saving a few cents where possible.

The mine superintendent can do more than any one else to keep his cost low. He knows his mine, equipment and men, what each section should produce and the production cost. He, of course, will need help at times from his production superior, the engineering department and the accounting department. And if he is wise, he will look to them for constructive criticism and welcome their

suggestions. For example, he may have a section which is not in his opinion producing sufficient tonnage at a satisfactory cost and want to know why the cost is too high. A good procedure is to call on the engineering department to make a series of time studies to uncover bottlenecks and find solutions so performance can be improved.

The superintendent should use the daily cost sheet to develop competitive spirit among his section foremen. He should let each foreman know his cost and how it compares with other sections in the same mine, and if there

are several mines he should compare his mine with them.

### COMPARE COSTS

Top management and the mine superintendent should be intensely interested in how present mine cost compares with that of the past. Naturally, labor and materials have increased with wages but comparison of present figures with those of the past may bring to light some valuable information. Particular attention should be focused on the distribution of labor at the mine and the tonnage produced. In many instances it will be found that too many men are being carried merely because they worked at a particular task several years ago when the mine was producing considerably more tonnage. These men should be reassigned to essential jobs where their efforts will be directed to increasing production.

In addition to comparing present and past figures at one mine it is helpful to compare present cost figures with present and past cost figures at other mines. This will make any abnormal figure stand out and start management searching for the reason. Continual study and comparison will prevent costs from creeping higher.

Daily cost sheets and comparison with other mines is not enough to tell the whole story. It is possible to make all sorts of comparisons but there is nothing to tell what the cost of production should be at a particular mine. A standard cost, tailored for the mine, will give the true picture.

### SET STANDARD COST

How does one go about establishing a standard cost? To many officials it sounds complex and confusing, yet on analysis, it is relatively simple and logical. Here are the steps to follow in establishing a standard cost:

#### 1. Determine the minimum idle time expense for each day.

This will include such items as salaries, depreciation, power, pumpers and anything that is necessary even though the mine is idle.

#### 2. Determine the standard cost for any one production day at the standard production for the mine.

This figure is established by time studies, knowledge of mining conditions, limitations of equipment and tippie capacity. The foundation for a standard production figure can be established by a series of conferences between key personnel of the operating and engineering departments. Engineering personnel can assemble all the facts and make necessary time studies, while production personnel can furnish information on men necessary to maintain production and mining conditions. Jointly they can arrive at a reasonable goal or standard daily production cost for the mine.

#### 3. Determine idle-time maintenance—the maintenance necessary on an idle day.

Maintenance of the mine and equipment during idle days will be determined by the natural conditions of the mine, type of equipment and the number of work days expected in the week. For example, a mine having good roof with normal water problems would require no idle-time maintenance of roadways and aircourses, and only a few pumpers. A hand-loading mine will require no mechanics, whereas a completely mechanized mine will require some.

Regardless of conditions and equipment, idle-time maintenance must be kept at a minimum. One way of cutting it is to set up mine maintenance so that major repair jobs can be performed on a nonproductive shift of a work day. For instance, if a mine is working two shifts per day, most of the maintenance work should be done on the third shift when there is no pressure to get the machine back in production. Where all maintenance is done during the operating shift there is a tendency to do a patch job rather than a permanent one.

#### 4. Set standards for other items on the cost sheet.

Examine in detail each cost item and determine if it is the lowest possible figure, or, better yet, start with

blank sheets and establish the total per ton to be permitted for each item. Again these must be realistic figures, attainable at the mine in question.

#### 5. Calculate total mining cost per month on the basis of zero to maximum working days using standard cost figures.

These values may be used to draw a cost curve useful to top management for predicting costs for any number of days worked each month. Information of this nature is helpful in determining what realization must be received to make a profit on the coal.

#### 6. Make a weekly summary and comparison of actual mining cost with the standard.

This can be compiled by the accounting department of a large company and the chief clerk of a small company. Distribution should be to everybody who had a part in establishing the standards so that results can be watched and compared by the management team. It will serve as a constant reminder that everybody is striving to meet a goal.

#### 7. Hold the superintendent responsible for deviations from the standard cost.

Since he has a part in establishing a standard cost and agrees that the production figures and cost figures are reasonable, the superintendent should be responsible for meeting the standard. No other individual can replace the superintendent as the watchdog of the company pocketbook. While holding him responsible for the cost, he must not be left to flounder in a sea of problems and be expected to solve all of them. He must expect and receive help from other operating personnel and from top management and the engineering department.

#### 8. Review the standard cost periodically to see if it still meets the conditions and is serving its purpose—keeping the cost down.

It may be necessary to revise the standard as conditions and equipment change, but any revision should be made only after careful study.

## V. Watch Supply Cost

Recent examples of steps taken to reduce the cost of supplies include the purchase of parts directly from the manufacturer rather than distributors by an eastern Kentucky operation.

A West Virginia company, among other things, took these three steps:

#### 1. Installed plastic pipe in acid-water areas.

2. Uses liquid neoprene on cable splices, for coating the insides of centrifugal pumps, foot valves on suction lines and damaged conveyor belting, thereby increasing their life.

3. Put bags of water-absorbing "Sova Beads" in equipment contractor panels and telephones, increasing the service life of electrical parts and wiring.

An Ohio operation reduces unit cost of supply items by buying in quantity, with deliveries scheduled to current needs.

Appointment of a superintendent of salvage was one of the steps recently taken by an Illinois company to reduce its supply cost. The salvage superintendent—an experienced mine

superintendent—has the last word on whether a material item or part can be saved or scrapped. To facilitate his work, he has been provided with the surface facilities of a worked-out mine for storage and handling of materials.

Another Illinois operator, with a number of old but serviceable mine cars on his hands as a result of the installation of larger modern equipment, assigned these old cars to supply service. In addition to making it unnecessary to use the new cars for supply-handling, the old cars can be parked in the receiving yard to receive material directly from trucks and to act as storage units until the material is needed.

As the cost of material and labor becomes greater, it becomes increasingly important to issue only those supplies that are essential to efficient operation. Many dollars are being buried in the gob because of poor control over supplies and ignorance as to what they cost. Since all mine supplies eventually go to the section foreman, he must be conscious of supply cost.

One method by which the foreman can be helped and also help himself is to have all supplies issued by a clerk through requisitions signed by the mine foreman or master mechanic. These requisitions should be filed by mine sections, and at the end of the month a list compiled of all items used in that section. At the beginning of each month a meeting of the section foremen, mine foreman, master mechanic, chief electrician and superintendent should be held to discuss the results. Not only does this give the section foremen an opportunity to see how much he spent for supplies, but also gives all foremen an opportunity to compare supply costs. Such a system keeps the foremen alert and discourages waste.

A way of supplementing the foreman's supply-cost sheet and aiding in making all mine personnel cost-conscious is a prominently mounted bulletin board with various supply items on it, along with the cost of each. Such items as a machine bit, cap wedge, roll of tape, track bolt, rail bond and the like are logical display items. Locating the supply display near the lamp house where everybody can see it each day will keep everybody alerted.

Abuse and poor maintenance also run up supply cost by increasing the consumption of parts, cables and so on. Keeping records by sections also permits pinpointing supply waste in addition to those practices that run up maintenance cost and cut productive time for men and machines.



**BRIDGE CONVEYOR** ups production one-third per loading machine and 10 tons per man-shift in a 40-in Kentucky seam (CA—Nov., 1951, p 87).



**OUTPUT INCREASED** 90 tons per unit through service improvement, particularly in main-line haulage, at a Utah mine (CA—Nov., 1951, p 76).



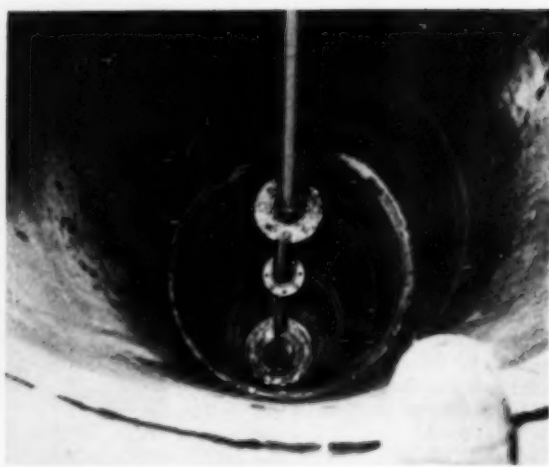
**ARTICULATED CONVEYOR** increases production by permitting continuous mining without transportation delays at the face (CA—May, 1951, p 77).



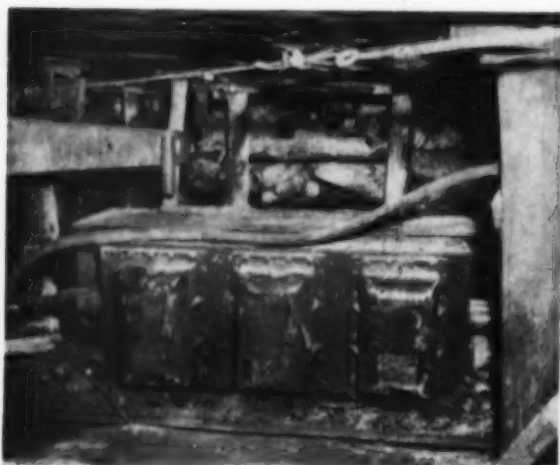
## COST CUTTING TODAY . . .



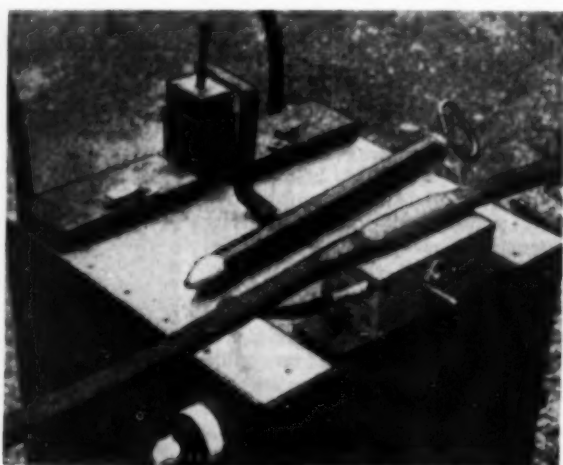
**INSTALLATION** of new vertical-turbine pumps protect against mine flooding and reduce labor, power and maintenance costs (CA—Aug., 1951, p 84).



**INCREASED FAN EFFICIENCY** and emergency escapeway were provided by a core-drilled shaft at one-tenth the cost of a conventional opening (CA—March, 1949, p 87).



**NEW MINE-POWER CENTERS** reduced by 90% the man-hours required to move underground substations and at the same time provided better voltage (CA—June, 1952, p 86).



**CABLE SPLICER** cuts splicing cost to \$1.50 and reduces labor for removing and installing trailing cables (CA—Jan., 1951, p 70).

## VI. Make Maintenance Work

The basic considerations in effective maintenance are epitomized by the policy at an Ohio operation, which proceeds as follows:

1. Stresses adequate lubrication at all times along with proper maintenance methods.
2. Provides the right facilities for the proper maintenance of all equipment in and around the mines.

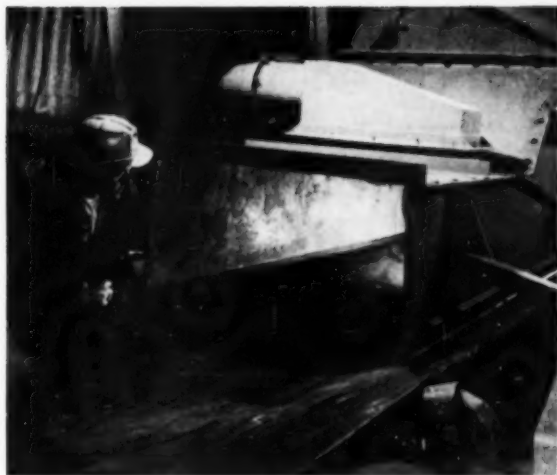
Proper maintenance at the proper time can be the difference between profit and loss in today's competitive market. Savings flowing from good maintenance practices are reflected in

uniform high production and low maintenance cost per ton. Good management and planning are the key to a successful maintenance program. Most progressive coal companies are sold on preventive maintenance—finding and fixing minor items before they become major breakdowns. Coupled with this should be systematic daily inspection of all equipment to make sure it is operating normally. A loose bolt or poor electrical connection spotted during an inspection and repaired immediately may save a major breakdown later. A few major breakdowns in a week will play havoc with the cost sheet.

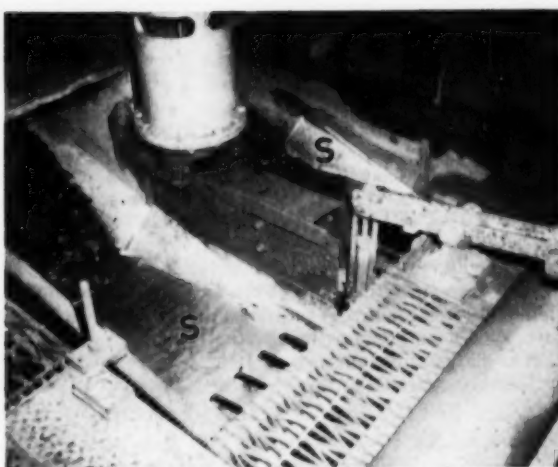
### REPAIR OFFSHIFT

To get the best results from maintenance personnel and to keep equipment producing at maximum rate during the working shift, the major portion of the repair work should be done on a nonproducing shift. If the mine is operating one shift, maintenance work should be done on the second shift. If the mine operates two shifts, then maintenance should be done on the third shift. Of course, it will be necessary to have repairmen available during the loading shifts, but their role will be minor if the offshift crews do a good job.





**ALLOY-STEEL** chute bottoms and liners minimize production losses and reduce maintenance cost, saving \$130,000 operating cost in Pennsylvania (CA—March, 1950, p 78).



**STAINLESS-STEEL** chutes and screens reduced maintenance labor and improved preparation plant performance at a 7,500-ton Ohio operation (CA—March, 1952, p 92).



**CENTRALIZED LUBRICATION** applied to strip equipment and preparation plant saves \$120,000 a year in maintenance and lubricants for Ohio producer (CA—Jan., 1952, p 76).



**WATER NEUTRALIZING** unit saved \$18,000 per year in labor, materials and equipment at a Missouri preparation plant (CA—Oct., 1952, p 94).

Another advantage of offshift maintenance is that repairmen who formerly were assigned to working sections during a producing shift may be reassigned to special crews for offshift maintenance. Duties of these special crews would be to inspect, service and repair all equipment on the working section.

Their efforts will be more productive and repair work be of better quality if they work in an atmosphere free from pressure to get the machine back in production, as happens when maintenance work is performed on the section during a working shift. In addition, they will be able to make repairs which cannot be made when coal is being produced. For example, if a loading machine needs a new

conveyor chain, it is better to put it on when the machine is not expected to be loading coal. Productive time should be concentrated on loading every pound of coal possible.

#### **TRAIN MAINTENANCE MEN**

New developments in equipment and purchases of said equipment by coal companies which had been hand loading produced a great demand for repairmen, with the result that many mines were without properly trained men to fill the jobs available. Efforts were concentrated on training operators for the new equipment, and maintenance was given a back seat. As the equipment grew older and older and repairs became more complex, the need for competent repair-

men came strongly to the foreground.

Many companies solved the problem by sending promising men to factories for training and establishing classes at or near the mine for mechanics, electricians and foremen. There are no short cuts or easy outs in the maintenance of complex modern mining machinery. The teacher and the pupil must start with fundamentals and progress to the complex mechanical, electrical and hydraulic mechanisms built into present equipment. Company-planned and sponsored classes or college extension courses are two possible methods for training personnel.

Time necessary to complete a sound program of training should be measured in terms of years rather than in

weeks or months, because of the few hours which can be devoted to training when men are working. From the long-range viewpoint the time and effort are short in comparison to the benefits derived. Few things around a coal mine pay as great dividends as competent maintenance men.

#### **MAKE DAILY REPORTS**

Daily section reports on equipment keep operating and maintenance personnel informed on equipment condition and performance. These, therefore, should be given as much attention as daily production reports. Items included in such reports should be: operating condition of each piece of

equipment, lubrication performed during the shift and condition of the entire lubrication system, maintenance work performed during the shift, nature and duration of any failures during the shift, and repairs to be made on the offshift. Information of this type keeps the master mechanic, mine foreman and superintendent informed and prevents bad practices from creeping into equipment maintenance.

Difficulties encountered in maintenance of equipment used on more than one shift can be partially eliminated by making each section mechanic responsible for specific equipment in addition to general maintenance of all equipment. For example, a mine

is working two shifts and has section equipment consisting of a continuous miner, pickup loader, two shuttle cars, roof-bolting equipment and a belt conveyor. One mechanic can be assigned the continuous miner, one shuttle car and belt conveyor to maintain in top-operating condition, plus performing any necessary maintenance on the remainder of the equipment. The other mechanic would be responsible for the loader, second shuttle car and bolting equipment. This method prevents passing the buck when a particular piece of equipment develops abnormal trouble and will soon spotlight maintenance weaknesses. Equipment performance will improve.

## **VII. Check New Methods**

Every progressive mining man should be searching for new and efficient equipment and methods to apply to his own property. By reading mining publications, attending meetings, visiting other operations and keeping in touch with manufacturers' representatives, the alert mining man can

keep informed on new ideas for cost-cutting.

The present trend is, in general, toward concentrating working sections and reducing the number of working places in each section down to as few as one, while at the same time increasing tons per man by using me-

chanical equipment, especially continuous miners. Where it is possible to eliminate a man from the crew by adding or improving equipment and methods, it is becoming increasingly important to do so. Equipment and methods that were considered modern only a short time ago are now becoming obsolete—and in the process new equipment and new methods are providing new lows in cost in every phase of operation.

## **VIII. Compare Results**

Proper performance records—tons, cost and otherwise—distributed to key personnel keep them informed on the results in each department or section. For example, a daily production record should contain such basic information as cubic yards stripped and coal

uncovered for a strip mine, coal loaded and cuts per section for a deep mine, mine tons loaded to date in the current and previous months, and mine tons loaded to date in the current and previous years. Information of this kind should be made available

to production supervisors so that they can compare performance—with each other, with the past and so on. It can have a definite effect on efficiency.

Weekly summaries of section performance posted in a conspicuous place promote competition between crews as well as between supervisors, and their value is enhanced if some recognition is accorded to both men and foremen.

## **IX. Check at Grassroots**

No program of cost reduction is complete unless top management keeps in touch with conditions and what is going on at the mine. There is no substitute for the footprints of the superintendent, general superin-

tendent, chief engineer or general manager in the pit or working section. While it is impossible for such men to spend all their time where production is going on, it is important that they see for themselves from time to time

what the conditions are and how equipment is performing.

Top management at the working place has an additional important psychological effect. Foremen and men appreciate the interest and in turn are more inclined to do their best. This is in addition to the insight into what is going on that top management itself receives.

## **X. Keep on the Beam**

In the last analysis, as pointed out in the introduction to this *Coal Age* Special Report, cost-cutting is a state

of mind. It therefore should be consciously in the forefront of the thinking of all men charged with any phase

of mine operation. This means that it will get the attention it really deserves. When that is the situation, the ground is laid for the maximum in progress—and in benefits for men, management and stockholders. The benefits merit the determination and effort necessary.

# How Are You on Cost Cutting?

## Top Manager

- Have you set a definite cost-cutting goal? ☐
- Do you have a clearcut policy on cutting cost? ☐
- Have you provided the best in equipment? ☐
- Do you make it a policy to replace equipment when new units will provide more tons per man and lower cost? ☐
- Have you provided competent operating management? ☐
- Does top policy include provisions for necessary training in all levels of management and supervision to improve proficiency? ☐
- Do you, through the comptroller or other authority provide for efficient cost-keeping and the distribution of reports to operating and supervisory personnel? ☐

## Operating Manager

- Have you provided good supervision for all phases of operation? ☐
- Have you provided training or opportunities for supervisors to improve their proficiency in operation and relations with employees? ☐
- Do you regularly analyze your costs? ☐
- Do you regularly analyze your operating practices in the mine, in the pit and on the surface? ☐
- Do you keep production records that provide immediate data on results? ☐
- Do you analyze your service operations—transportation, power, maintenance, ventilation, drainage and the like to see if they are efficient? ☐
- Do you regularly check supply purchases and use? ☐
- Do you regularly check on new methods and equipment to see what they might do for you? ☐
- Do you keep in personal touch with mine operations and the supervisors under you to check conditions and progress? ☐
- Is your safety record better than the average—and is it improving? ☐

## Maintenance Manager

- Is the voltage at your machine terminals within 10% of the motor rating? ☐
- Is the time lost by production machines as a result of electrical and mechanical breakdowns less than 2% of actual operating time? ☐
- Do you regularly check on machine operation and power supply to prevent abuses? ☐
- Do you keep track of new developments in maintenance and in materials designed to reduce machine outages? ☐
- Do you check on supply and parts use to prevent loss and waste? ☐

## Face Supervisor

- Do you study your methods and your section to see where you can increase tons per man? ☐
- Do you suggest improvements in practice for fuller investigation? ☐
- Do you check on supply use to prevent loss and waste? ☐
- Do you train operators to use equipment properly for better performance and prevention of abuse? ☐
- Do you cooperate with maintenance men in keeping machines running? ☐
- Do you take an active part in fostering good employee relations? ☐



**STRIP** WALKING DRAGLINE, with 200-ft boom and 22-cu yd bucket, removes overburden from coal after blasting as one step in producing 2,000 tons of strip coal per day.



**AUGER** AUGER with 8-man crew produces 400 tons of coal per shift. Coal from Redstone and Pittsburgh seams is delivered to the storage bin by three or four 18-ton diesel-truck units, depending on haulage distance.

## How Compass Coal Combines Deep, Strip and Auger Mining To Produce 7,400 Tons Daily With 284 Men on the Payroll





**DEEP** LARGE-CAPACITY shuttle cars delivering coal to a 30-in belt conveyor system are typical of underground equipment used in deep mining. Crews load up to 800 tons per shift.



**QUALITY** CENTER OF COMPASS PREPARATION is this five-track cleaning plant incorporating sand-flotation cleaning, loading booms, layer loading and oil treating for high quality and uniformity.

HIGH PRODUCTION and low cost are achieved at the Compass mine of the Compass Coal Co., Philippi, W. Va., by using high-capacity deep, strip and auger mining equipment. Top-notch management has coordinated the operations to produce 7,400 tons of clean coal per day with only 284 men on the payroll.

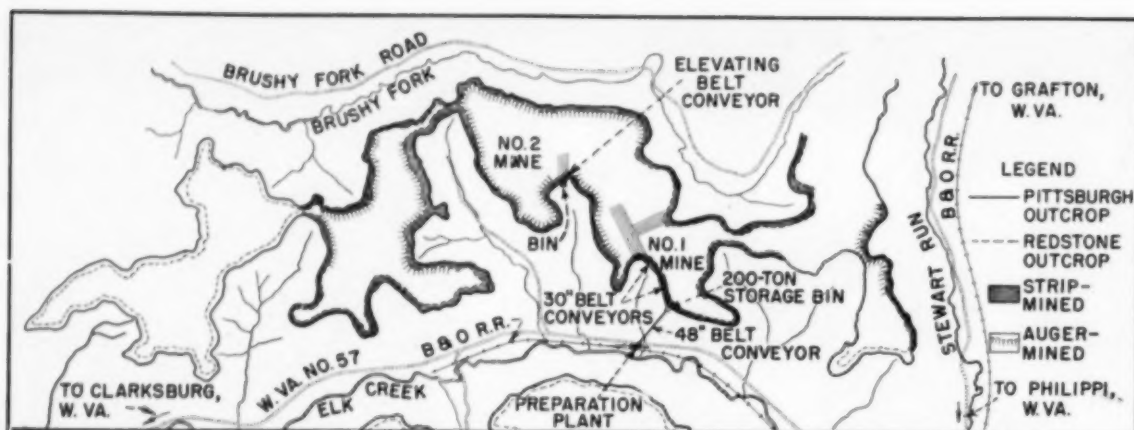
Compass Coal Co. is a subsidiary of the Clinchfield Coal Corp., Dante, Va., and belongs to the Pittston group of coal-producing companies. In 1946 the Pittston Co. began a program of expansion and modernization to supply their customers with high-quality

By A. E. FLOWERS  
Assistant Editor, Coal Age

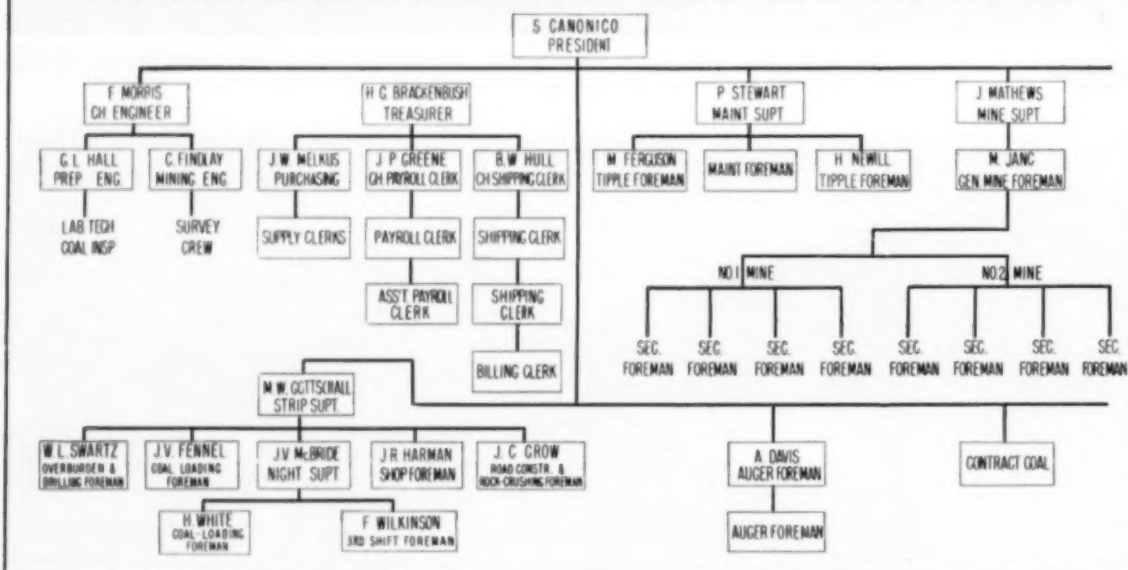
coal from all major fields. Until the Compass mine was opened they produced no steam coal from the Fairmont field, having anthracite, high-volatile and low-volatile coals available from other sources. To serve the many power and industrial plants being constructed and expanded on the eastern seaboard with a high-volatile moderately-priced fuel, the Clinchfield Coal Corp. decided to develop the Compass mine. Conditions indi-

cated that high-capacity modern equipment and top-notch management would make possible an efficient, profitable operation.

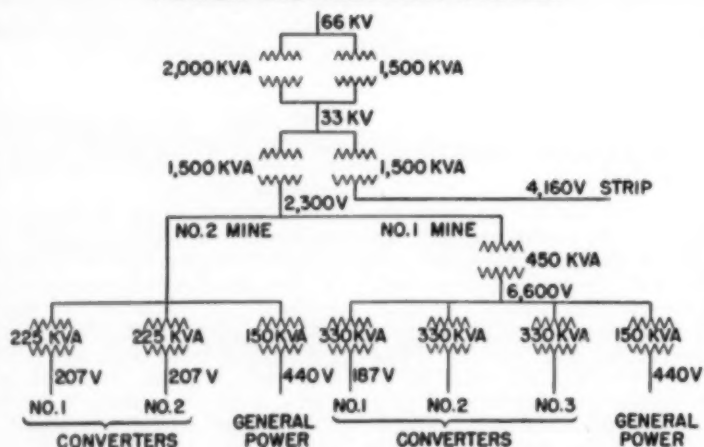
Strip mining of the Redstone and Pittsburgh seams was the only source of coal when operations were begun in 1949. Actual mining was contracted to the Dick Construction Co., Hazleton, Pa., who mined and delivered the coal to the new Compass Fairmont-built cleaning plant on Elk Creek, Barbour County, West Virginia. Auger mining was added in March, 1951; Deep Mine No. 1 was opened in January, 1952; and Deep



## HOW COMPASS COAL IS ORGANIZED FOR EFFICIENT HIGH TONNAGE



## POWER DISTRIBUTION SYSTEM



Mine No. 2 was opened in June, 1952. Clinchfield purchased strip equipment from the Dick Construction Co. in November, 1951, and since that time has continued strip mining under its own management. A fourth source of coal is from isolated areas of coal leased to contractors.

Working two shifts, Compass produces 7,400 tons of clean coal. Production from the various sources is as follows:

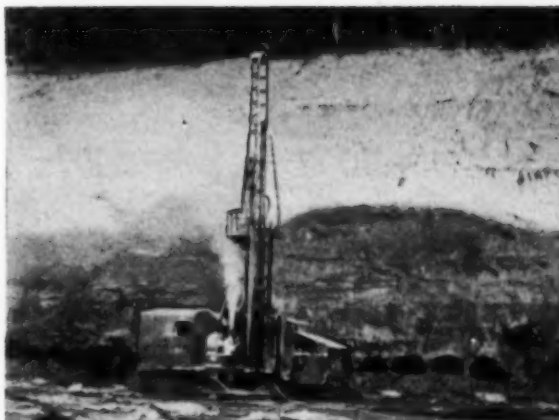
Strip	2,000 tons
Auger	800 tons
Deep	3,200 tons
Contract	1,400 tons
Total	7,400 tons

## Strip Mining

Two seams, the Redstone, averaging 4 ft in thickness, and the Pitts-



**ELECTRIC SHOVEL**, equipped with 5-cu yd bucket, makes bench cut for dragline roadway.



**BLASTHOLES**, 7½ in in diameter, on 15x15- or 15x18-ft rectangles, are drilled by two units, operating two shifts.



**POWER SWEEPING** is one step in cleaning the coal before it is loaded. A 4½-cu yd diesel shovel loads coal into 18-ton diesel-powered haulage units for transportation to the tippie storage bin.



burgh, averaging 7 ft, are mined on a two-shift basis at Compass. Interval between the two seams ranges from 26 to 40 ft. Overburden consists mainly of shales, sandy shales and sandstone.

The stripping cycle consists of removing the Pittsburgh seam back to a point beneath the Redstone outcrop. Then the Redstone seam is removed to a 40-ft highwall. After augering has been completed in the Redstone, the Pittsburgh seam is stripped beneath the area where the Redstone was removed. Augering in the Pittsburgh seam follows the second strip cut in that seam.

A 240-ton Bucyrus-Erie 170-B electrically powered 5-cu yd shovel makes a 90 to 100-ft bench cut on the Pittsburgh outcrop to provide working space for a Bucyrus-Erie 1150B walking dragline, which completes the overburden removal for the first cut of Pittsburgh. In most instances no shooting is necessary in making the preparatory bench cut. However, a

McCarthy horizontal drill is sometimes used when rock is encountered and blasting is necessary. Top of the highwall after first Pittsburgh cut is at the Redstone outcrop.

After the bench is made, blastholes 30 to 60 ft deep are drilled by two Joy Champion drills operating three shifts per day. Holes are spaced on 15x15- or 15x18-ft rectangles, depending on depth and hardness of overburden. Each unit drills approximately 300 ft of 7½-in diameter blastholes per shift. Oil-well-type bits drill 8,000 ft of blastholes before being replaced and in some instances have drilled up to 14,000 ft.

Nitramon powder, connected with Primacord, is used to blast 95% of the overburden, while du Pont Red Cross Extra is used for the remainder. Hole loading is done throughout the week and blasting is generally scheduled for Saturday afternoon when approximately 15 tons of explosive are set off.

A Bucyrus-Erie 1150B electric drag-

line, weighing 1,300 tons and equipped with a 22-cu yd bucket, removes 5,000 cu yd of overburden and uncovers 1,000 tons of coal per shift.

Coal cleaning is a fourfold process at Compass and is the first step in loading a quality product. These steps are as follows:

1. **Bulldozer** scrapes off the remaining overburden left by the dragline.
2. **Motor grader** removes impurities at the top of the coal seam.
3. **Power sweeper** removes fine dirt from top of coal.
4. **Men with shovels** remove any material remaining.

Coal is blasted lightly before being loaded into trucks by a diesel-powered 4½-cu yd Lima shovel. Ten diesel-powered Sterling dump trucks, each carrying 18 to 20 tons, haul coal approximately 3 mi to a 200-ton storage bin located on the Pittsburgh seam outcrop above the tippie.

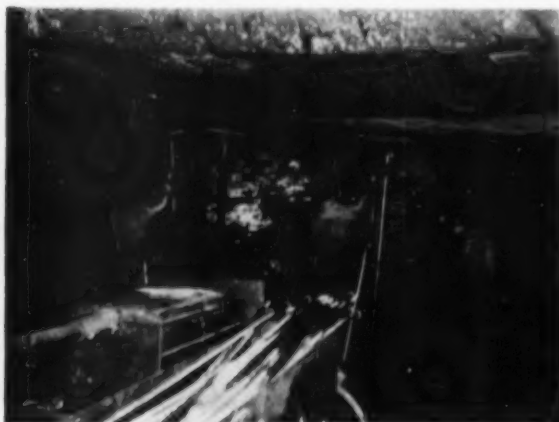
After the first cut of Pittsburgh has been stripped, overburden removal begins for the Redstone. Stripping



**CUTTING CREW** top cuts and shears 18 to 22 places per shift. Frequent bit changes are necessary.



**SELF-PROPELLED** hydraulic drill, operated by one man, drills four holes per place.



**BOLTING CREW**, equipped with self-propelled compressor, stoppers and impact wrench, installs six bolts in 20 min.



**TESTING TORQUE** on roof bolts is daily task for mine foreman and bolting crew.

procedure is the same as for the first Pittsburgh cut, with a 40-ft highwall above the Redstone set as the limit. However, in steep areas it is necessary to remove as much material as is necessary to leave a 90-ft bench for the dragline.

Following removal of the Redstone no further stripping is carried out until auger mining has been completed in the Redstone. A Compton 48-in auger, equipped with a 52-in cutting head, is used to auger both seams. This unit produces 400 tons of coal per shift.

Stripping operations are completed after removal of the second Pittsburgh cut directly beneath the first Redstone cut. This procedure results in approximately a 90-ft highwall. A feature of the strip haulage is use of the top of the spoil as the haulage road. This permits the trucks to operate on a solid well-drained road well above any pools which might accumulate in the pits.

Auger mining is conducted in the

Pittsburgh seam to a depth of 175 ft after stripping is completed. Combined stripping ratio is about 7 to 1. Positive pit drainage is provided by having the dragline make a ditch between the spoil area and the second Pittsburgh cut while uncovering coal. Strategically located windows permit water to flow downhill.

Maintenance work is done in the pit as much as possible. For such jobs as overhauling trucks, bulldozers and shovel buckets, a well-equipped shop is available on the property. Fourteen welders and mechanics, working two shifts, perform these duties. Large machine-shop work and armature re-winding are contracted to specialists in these fields.

Compass strip mine is under the supervision of W. M. Gottschall, superintendent. J. V. McBride is night superintendent; W. L. Swartz is foreman in charge of drilling and overburden removal; J. V. Fennel is in charge of coal loading and road building; and Harry White supervises coal

loading on the second shift. J. R. Harman is shop foreman, and Fred Wilkinson is third shift foreman.

## Deep Mining

In the fall of 1951, plans were made to expand operations at Compass by adding deep-mined coal to that produced from strip and auger mining. Preliminary plans and problems consisted of selecting a portal site, transportation method, mining equipment and mining method.

In reaching decisions, management stressed flexibility because all coal available could not be extracted from one portal. As a result, belt conveyors, bins, overcasts, fan ducts and mine buildings were selected or designed to permit easy disassembly and re-erection.

Since the property resembles a series of islands, location of a portal required that as much coal as possible be mined from the opening selected. Belt haulage was selected to provide





**DEEP-MINED COAL** from No. 1 mine (right) is carried to the storage bin by 30-in belt conveyor, while coal from No. 2 mine is elevated to a 100-ton storage bin. Forty-ton dropbottom trucks haul coal to the tippie.



**OVERCASTS** are made of corrugated sheet steel assembled with bolts. They will be recovered on retreat.



**SUPERVISORS** M. Janc, mine foreman, C. Findlay, mining engineer and J. Mathews, superintendent in the mine.

economical underground and all-weather outdoor transportation of coal from No. 1 mine. Modern high-capacity mining equipment was selected to assure high production at minimum cost. A mining method was designed to permit equipment to perform at maximum efficiency.

All underground transportation from the section loading point to the portal is by 30-in belt conveyor. Results from the first underground unit prompted Clinchfield and Compass officials to increase their deep-mine production. A second unit was added to Deep Mine No. 1 in the spring of 1952 and Deep Mine No. 2 was opened in June, 1952. Coal mined at No. 2 mine is elevated by a 30-in belt conveyor to a 100-ton Armco storage bin. Forty-ton dropbottom Euclid trucks transport coal from the mine bin to the storage bin above the tippie.

**Six-Entry System**—Main entries are developed 14 ft wide in a six-entry system, providing 11 working places for the equipment. Breakthroughs be-

tween headings are driven at right angles on 60-ft centers except between Headings 1, 2 and 3, where they are driven on 80-ft centers. Where pillars are to be extracted, six headings on 60-ft centers are driven to the mining limit and pillars extracted on retreat, leaving only bleeder entries.

Coal ranges from 5 to 9 ft in thickness. Typical soft drawslate overlies the coal but a hard layer of shale 5 ft above the seam permits roof bolting. The bottom is hard shale underlain by soft fireclay.

**High Tonnage**—Loading crews operate Joy 11-BU loading machines, 10-SC shuttle cars, 10-RU cutting machines, WK83R self-propelled air compressors with MSA dust collectors, LeRoi stopers, Joy CD 25 self-propelled hydraulic coal drills and Chicago Pneumatic impact wrenches. These crews load 400 to 750 tons of coal per shift, depending on the natural conditions in the section. In some instances they have loaded over 800 tons per shift.

Coal is top cut and sheared on the righthand rib before being drilled and blasted. Cutting is difficult, requiring frequent bit changes and a top-notch crew to cut the 18 to 22 places necessary to provide coal for the loading machine.

Four blastholes, three on the bottom and one snub shot on the left rib, are drilled by one man operating a self-propelled hydraulic drill. Holes are charged with 1 lb of explosive and fired individually.

Two shuttle cars receive coal from the loader and transport it a maximum distance of 300 ft to a Goodman 97C belt conveyor which carries it to the portal. When coal reaches the portal of No. 1 mine it discharges into a series of Hewitt-Robins belt conveyors for delivery to the tippie storage bin. Coal from No. 2 mine is elevated by belt conveyor to a 100-ton Armco storage bin. Two 40-ton Euclid dropbottom trucks transport this coal to the tippie storage bin.

**Roof-Bolting**—A four-man roof-bolt-



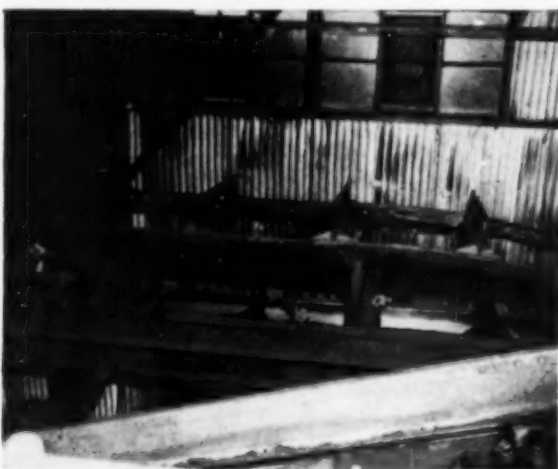
**BELT CONVEYOR**, 48 in wide, delivers blended coal from strip, deep and auger mining to the primary breaker.



**SAND-FLOTATION** cone, operating at 1.45 gravity, separates 375 tons of 6x% coal and refuse per hour.



**CLASSIFYING SCREENS** dewater, desand and size clean 6x% before it is loaded into railroad cars.



**MIXING CONVEYOR** permits loading separately or mixing of all sizes produced in the preparation plant.



**MOVABLE CHUTE** diverts mine refuse from coal belt to refuse belt. Unit permits continuous flow of material.



**DAILY ANALYSIS** of coal shipments is one step in assuring the customer a high-quality product.





on the front wheels pull the unit along the frame.

A 35-ft auger section 48-in in diameter is attached to the driving unit. Auger sections are handled by steel ropes powered by two hydraulic hoists mounted at the top of the auger frame. The cylindrical 52-in auger head is made of  $\frac{3}{4}$ -in steel and has a center breaker ring. Carbide-tipped bits equally spaced around the circumference of the head and the breaker ring, cut a core as the auger rotates. The breaker ring simultaneously breaks the core.

After the head has advanced 35 ft, the auger is disconnected from the power unit and the power unit is retracted to the original position. Another auger section is added between the section in the hole and the power unit. Connections are made and the unit is ready to drill another 35 ft.

The auger turning clockwise at speed of 45 rpm, conveys coal to the rear and discharges it on the elevating conveyor. Coal from the elevator discharges into 18-ton Sterling trucks which haul it to the storage bin.

When the hole has been completed, the power unit is retracted and auger sections removed and placed on racks built in the auger frame. An International Harvester TD 24 bulldozer then pushes the auger to a new location.

## Preparation

Coal from Compass deep, strip and auger mining, plus coal from isolated areas leased to responsible contractors, is dumped in the large storage bin above the tippie.

A 48-in belt conveyor carries coal from the 200-ton bin to the tippie. Coal is fed to the belt by a Link-Belt reciprocating feeder whose feed may be adjusted by the tippie operator at the control panel. Present feed is about 500 tph.

The belt discharges into a 9x17 Bradford breaker which breaks large lumps to minus 6 in. Hard lumps of bony coal and refuse are discharged directly to the refuse bin. Minus 6-in material passes to a scalping screen where the feed is divided into 6x1 $\frac{1}{4}$  and 1 $\frac{1}{4}$ x0, the 6x1 $\frac{1}{4}$  product going to the Chance cone, or to a single-roll crusher if slack or stoker sizes are being made. Through product of the crusher is rescreened when stoker sizes are loaded.

Four 6x16-ft Allis-Chalmers Ripl-Flo vibrators, equipped with  $\frac{3}{4}$ x4-in slotted stainless-steel screens, receive 1 $\frac{1}{4}$ x0 from the scalping screen and separate it into 1 $\frac{1}{4}$ x $\frac{3}{4}$  and  $\frac{3}{4}$ x0 products. The coarse product goes to a scraper conveyor which carries it and

**Table I.—Size Consist, Compass Coal Shipments**

SIZE	%
2x5	19
1 $\frac{1}{4}$ x2	13
$\frac{3}{4}$ x1 $\frac{1}{4}$	16
$\frac{3}{4}$ x $\frac{3}{4}$	25
$\frac{3}{4}$ x0	27

**Table II.—How Compass Coal Analyzes After Preparation**

	SIZE	
	$\frac{3}{4}$ x1 $\frac{1}{4}$	1 $\frac{1}{4}$ x2
M	2.4	2.1
A	7.1	7.6
V M	38.8	29.3
F C	51.7	51.0
Btu (As recd.)	13,970	13,846
S	2.8	2.8
Fusion	2165	2195
F S Index	8 $\frac{1}{2}$	7 $\frac{1}{2}$
Grindability	62.8	57.2

the 6x1 $\frac{1}{4}$  to a 42-in belt conveyor, delivering raw 6x $\frac{3}{4}$  coal to a 15-ft Chance cone. This unit, driven by a 15-hp Type CS totally enclosed Westinghouse motor transmitting power through a Philadelphia heavy-duty worm-gear reducer, operates at a specific gravity of 1.45 and cleans 375 tons of coal per hour.

Clean 6x $\frac{3}{4}$  coal passes from the Chance cone to dewatering, desanding and classifying screens. Products from these screens are  $\frac{3}{4}$ x $\frac{3}{4}$ , 1 $\frac{1}{4}$ x $\frac{3}{4}$ , 2x1 $\frac{1}{4}$  and 6x2. Two 5x14-ft double-deck Allis-Chalmers Low Head vibrators equipped with Ty-rod screens are used for secondary dewatering of the  $\frac{3}{4}$ x $\frac{3}{4}$  product.

A mixing conveyor receives  $\frac{3}{4}$ x0 and  $\frac{3}{4}$ x $\frac{3}{4}$  coal from the classifying screens and carries it to the loading tracks. Tracks 1, 2 and 3 are equipped with adjustable loading booms and oil sprays. Track 4 has oil sprays, permitting oil treatment of  $\frac{3}{4}$ x $\frac{3}{4}$  or  $\frac{3}{4}$ x0 if desired. Brown-Fayro hoists provide layer-loading facilities for all sizes.

Water for the cleaning plant is obtained from Elk Creek. A two-stage Peerless pump, driven by a 40-hp motor, delivers water to two 50,000-gal tanks located on the hillside above the tippie. Water flows by gravity to the cleaning plant.

Silt from the Chance-cone system is pumped to silt dams above the tippie where the solids settle out and the clarified water returns to Elk Creek.

Heating of the tippie is provided by projection-type steam heaters. A Fitzgibbons boiler equipped with a Winkler stoker provides steam for the heaters.

## Quality Control

Quality control rates top consideration at Compass mine. A well-equipped laboratory is maintained so that results of analyses may be obtained quickly. Composite analyses of all coal containing slack are made daily and regular analyses are made of all other sizes. A shift-composite analysis is made of all slack coal loaded. In addition, separate analyses are made for each shipment of coal. Channel samples are taken regularly in the strip pit and underground. Regular samples are also taken of auger-mined coal. Results of strip-channel samples are plotted on an analysis map to aid in predicting quality of coal from deep mining. Every effort is exerted to assure the customer of a high quality uniform product.

## Supply System

Supply control is another method used at Compass to keep operating cost at a minimum. All supplies are stored in numbered bins in a supply house and are issued only when a properly signed requisition is presented. This prevents maintenance men from obtaining parts not needed and assures that ample supplies are available when required.

A perpetual inventory, using a Kardex system, is kept of all parts in the supply house. The system permits the supply department to have at its fingertips such vital data as quantity of item in stock, quantity on order, order number, date ordered, unit price and delivery dates on previous orders.

J. W. Melkus, purchasing agent, is responsible for the purchase and distribution of all supplies. His department is organized to provide service on all working shifts so that untrained personnel are not engaged to issue supplies.

## Management

J. P. Routh is president of the Clinchfield Coal Corp. and R. H. Hughes is vice president in charge of operations. S. Canonico is president of the Compass Coal Co.; H. G. Brackenbush is treasurer; Frank Morris is chief engineer; C. Findlay is mining engineer; and G. L. Hall is preparation engineer. Paul Stewart is maintenance superintendent in charge of all underground, tippie and power maintenance. J. Mathews is mine superintendent and M. Janc is general mine foreman for both mines. Albert Davis is auger foreman. Among the other achievements of this management is the mining of 3,000,000 tons of coal without a fatal accident.





## Anthracite and Iron— *A Story of the Early Days*

WITH THE CONSTRUCTION of the Fairless Works of the U. S. Steel Co., in eastern Pennsylvania, steel-making in the United States might be described as having completed the circle from the location standpoint, since the anthracite region of the state was once considered the logical source of fuel for smelting iron ore. For example, in summarizing the industry's history, a recent issue of *Steelways* Magazine quotes from "Percy's Metallurgy," published in London in 1864, on contemporary U.S. operations thus:

"But the principal manufacture must always cling to the Lehigh and Schuylkill and lower Susquehanna valleys in Pennsylvania where the iron ore is abundant, the coal near at hand, and the flux on the spot (and) where the whole land is a garden, and therefore food cheap and labor plentiful, and the great seaports not far off. For all these considerations, as well as for beauty, size, and convenience of build, and for its historic interest, Thomas furnaces, which have been selected as illustration of the American manufacture for this work, stand preeminent."

About Mr. Thomas and his furnaces, the author of the *Steelways* article, C. H. H. Weikel, relates these facts.

—Illustration from *Steelways*, published by American Iron & Steel Institute.

David Thomas was born in Glamorganshire, South Wales, in 1794, the son of a poor farmer. Though his father hoped the young man would take up farming, he went to work at the age of 17 in the Neath Abbey Iron Works.

When he was 23, Mr. Thomas was made superintendent of the furnace and coal and iron mines of the Yniscledwin Iron Works, an alphabetical curiosity that only a Welshman could pronounce. The Yniscledwin works stood on the only basin of anthracite in Great Britain; nevertheless, coke was hauled 14 mi to feed the furnace.

David Thomas assumed that the Creator had placed the ore and coal close together for a purpose, so he set about experimenting with anthracite as a blast-furnace fuel. He met with spotty success.

But in those days furnaces were fed a cold blast of air because someone had concluded that English furnaces made more iron in winter than in summer. Meanwhile, James Neilson, in Glasgow, was seeking a means of increasing the blast in a furnace that was a half mile from the blowing engine. Thinking he could get more oxygen to the furnace by expanding the air, he heated the blast to 80 deg F (compared to 1,200 deg F in modern furnaces) and achieved a measure of success.

The word came round to David Thomas. He and his employer, George Crane, put their heads together, built a new furnace to receive a heated blast of air, and managed to successfully smelt iron with anthracite. This was in 1837. Mr. Thomas already had completed a 25-yr business career, but his career as father of the American anthracite-iron industry had not yet begun.

The success of the Yniscledwin Works came to the attention of officials of Lehigh Coal & Navigation Co., which also had good supplies of ore and anthracite at hand. Erskine Hazard was sent to Wales to investigate the process and was authorized to hire someone to come to America to supervise construction of a furnace on the Lehigh River. He chose David Thomas.

After wrestling with the issue of uprooting his family and starting a new life, Mr. Thomas decided to come for at least 5 yr.

On July 3, 1840, after many setbacks in procuring the necessary materials and machinery, most of which was made only in England, Mr. Thomas managed to blow in his first furnace in America. Though it was not the first furnace in America to smelt iron with anthracite, it was outstanding for its time. It produced up to 52 tons in a week before it was flooded by the river. This and subsequent Thomas furnaces were in fact preeminent.

In 1847, Mr. Thomas' son capped the works at Catasauqua with the first steam whistle in the region, a lusty voice for the infant anthracite-iron industry.



U. S. Bureau of Mines photos

**STOTESBURY PROBLEM**—heavy falls up to 40 to 50 ft. Photo at the left shows typical failure of the laminated slate roof extending up to 50 ft. Falls such as those at the right have gone up about 40 ft. However, natural arching usually takes place at about  $1\frac{1}{2}$  times heading width.

## Bolting Beats Bad Top

What's the answer when the heaviest steel timbering fails? Stotesbury No.

8 found it in out-of-the-ordinary roof-bolting.

By J. H. EDWARDS  
Associate Editor, Coal Age

**ROOF-BOLTING COST** per lineal foot of haulage heading through heavy grading in bad territory is less than one-tenth the cost of conventional timbering in Stotesbury No. 8 mine of Eastern Gas & Fuel Associates, Coal Div., Raleigh County, W. Va.

Although some of the bolting has cost over \$15 per lineal foot of heading and even so is not sure to hold, roof-bolting as a whole has been highly successful in protecting a haulage roof considered the most difficult in the state. Conventional timbering of wood or steel or both, made exceedingly strong, had failed repeatedly. The bolting includes several innovations, such as, using 8-bolt channels and installing four short bolts per

channel when advancing in coal, adding four long bolts per channels when grading bottom, and shooting down some bolted roof a few months after installation and then re-bolting.

### ROOF REALLY TOUGH

Although of a hard sandstone, the top is laminated in structure for 40 to 50 ft above the coal. Upon failure in a 14-ft-wide heading the falls continue until the top of the arch is usually about 21 ft above the top of the coal. Falls of 40 ft have occurred over some places only 14 to 18 ft wide. Circular steel sets which should carry 60 to 90 ft of overburden have failed repeatedly. Consistency is lacking. The roof in one heading of an entry may be held without difficulty while another heading in the entry may present the most difficult of conditions.

Stotesbury No. 8, in the Winding Gulf field, is in the Pocahontas No. 4

seam. At the tippie and slope the coal is 55 ft below railroad level and dips generally 3% northeast. The mine development is in that general direction and the cover reaches 900 ft.

The seam has numerous undulations averaging 1,000 ft between crests and presenting grades up to 14%. Seam thickness averages 39 in and ranges from 28 to 42 in. Rash 2 to 6 in thick occurs at the top. Near the middle is a fired clay parting ranging from  $\frac{1}{16}$  to 8 in. The coal is soft and friable and of very high quality. Prepared sizes go to domestic markets and much of the slack to by-product users.

Lying 160 ft above the present workings is the Beckley seam which was mined out some years ago with a recovery of approximately 80%. Fourteen gas wells penetrate the active area of the Pocahontas No. 4. Locations of the bad-roof sections appear to bear no relationship to the worked-



**BOLTING THE ANSWER**—first installation made in 1948 is still holding effectively. Initial 36-in bolts were later supplemented with 80-in bolts placed vertically in four-hole channels.

out seam above nor to the pillars left around gas wells.

Pocahontas No. 4 is a gassy mine and encounters little water. The bottom is a hard fireclay and presents difficulties from heaving in only a few places.

#### EARLY DEVELOPMENT

The mine was opened in 1922 and reasonably good roof conditions prevailed until the early 30s when development had progressed back to thick cover. At present the farthest active section is 2½ mi from the slope bottom. Conveyor mining, using chain-type face and room conveyors, is the practice. Rooms are driven 35 ft wide on 80-ft centers. In bringing back the pillar the whole 45 ft is taken if conditions permit.

As the face is advanced in rooms, posts are set on 4-ft centers and cribs are installed as conditions dictate. These are 24x24-in and are built of 6x8x24-in wooden blocks. Some of the cribs are built skeleton-fashion and others solid. On retreat, two rows of cribs are set on 6-ft centers behind the face conveyor to promote roof breaks. The back row is moved forward each cut. The mine produces 1,900 tpd, operating two shifts per day.

Haulage from the room neck to the slope bottom is by 4-ton solid-body steel cars. Considerable rock work is necessary to provide height on the haulways and bring the tracks to economical grades. This grading is planned to take bottom as far as possible but the roof must be taken in many places.

#### ENTRY PRACTICE

Mains are driven with six headings and room entries with three. Looking in by on the mains, and counting from left to right, Headings 1, 2, 5 and 6 are return airways and 3 and 4 are intakes and haulage. Where the roof of the main returns cannot be held by posting or short roof bolts, slating is the practice, taking bottom if possible, followed by permanent timbering with either or both long bolts or rail headers on locust posts. Seven feet is the usual height to secure a minimum cross section of 100 sq ft for effective ventilation.

In some places the hard laminated sandstone of the first 50 ft contains thin partings of shaly slate. However, that condition seems to have little effect on roof behavior. When timber sets, which are principally of locust and sometimes placed almost skin to skin, failed to hold the roof on a haul-

way, 60- to 85-lb steel-rail crossbars were installed. When these failed, the size was raised to 131-lb and later they were installed double-deck. Even so, roof weight continued to wreck the timbering.

#### CIRCULAR SETS TRIED

As a last resort, before the days of roof-bolting, circular steel sets were installed for several hundred feet where the top was bad. They were placed on 42-in centers, leaving the existing timbering in place as far as possible. After a few months many of these tunnel supports, consisting of 8-in wide-flange I-beams weighing 42-lb per ft, crumpled like paper. As far as known, the vertical weight consisted only of the 20 to 50 ft of laminated sandstone, which had broken to the natural arch or massive sandstone above. Calculations indicate that terrific forces were acting in other directions than vertical.

In 1948, soon after the U. S. Bureau of Mines started to advocate roof-bolting trials, experiments were initiated in Stokesbury No. 8. Since the effectiveness of roof-bolting usually is a result of binding the strata together it appeared that the hard laminated sandstone offered an ideal condition for bolting. In a measure this proved true but not to the extent anticipated. Roof bolts have proved invaluable in the mine but have not solved all of the problems.

#### BOLTING STARTS

The first bolting was done in undisturbed roof where 18 ft of bottom was later lifted to grade. Bolts, 1 in in diameter, 36 in long, slot-and-wedge type with individual plate washers, were installed four per row in holes drilled at 45-deg angles pointing toward the rib lines. Action of the roof indicated that more bolts were needed and, as the grading provided enough height for installation, four-hole channels were added between rows of original bolts. These channels were held with 80-in bolts placed vertically. This early change to vertical bolting, later adopted as standard in the mine, was made because only a very slight slippage or decrease in tension of a slanting bolt results in marked decrease in binding action. For the most part the first roof-bolting with 36- and 80-in bolts is holding to this day.

In that same year, 1948, the ribs in deeply graded cuts were bolted to prevent sloughing. Bolts 30 to 48 in long were installed and have been completely effective in preventing sloughing and especially valuable in holding corners at turnouts. As with all other bolts used in the mine, these





**DOUBLE-DECKED 131-LB RAILS**, 13-ft spans on 4-ft centers were tried but failed in many bad locations.



**STEEL ARCHES** (background), one of two other steel timbering methods, also failed to hold in the worst places.



**MANY WIDE FLANGE I-BEAMS**, 8-in, 42-lb, set between existing sets on 42-in centers, crumpled like paper.



**ARCHED I-BEAMS** supporting many feet of loose material have showed no signs of failing.

## Heavy steel the first resort at Stotesbury but . . .

rib bolts are 1-in and of the slot-and-wedge type.

Roof bolting has been continued over the years. In spite of close bolting, some places have fallen, especially during shutdowns of a week or more when the roof is not watched closely and steps cannot be taken to add more bolts. So far as safety is concerned, the failures give plenty of warning during regular operation.

### NO FAILURE PATTERN

Failures exhibit little rhyme or reason. For instance, a bolted heading may fall while a bolted breakthrough

immediately adjacent holds perfectly. The bolts may hold along a continuous mile of one heading while along that same mile in an adjacent heading the bolted roof may start sagging and will require more bolts or taking down. With failures under low roof there is great difficulty because lack of height precludes installation of timber crossbars or long bolts in such areas.

When driving a heading in the coal where conditions warrant roof-bolting, the maximum bolt possible, 36-in, is not long enough for a comparatively permanent job. To cope with this

situation the management introduced an 8-hole channel for use where the natural roof is not to be disturbed later by grading.

These channels are provided with four pairs of holes. Holes in each pair are about 6 in apart. Four 36-in bolts are installed as the heading is driven in the coal. Then, after bottom has been lifted for grading, four 80-in bolts are installed in the other four holes of the channel. Use of bolts instead of posts and crossbars is especially advantageous because there are no obstructions to bottom grading and the roof is safely held.





**EIGHT-HOLE CHANNEL**, apparently first at Stotesbury, applied with four 36-in bolts, then with 80-in vertical bolts.



**BOLTED 3 YR AGO**, washers first, then channels, No. 3 heading, No. 2 Mains, still holds firm.



**ROOM HEADING CAVED** but breakthrough appears strong and firm with 36-in roof bolts.



**RIB-BOLTING**, shown by J. W. Richardson, safety inspector, has prevented rock sloughing since 1948.

## Roof-bolting proves more effective despite failures.

An unusual fact is that much of the roof bolted with 36-in bolts and channels is shot down within 4 mo to a year after installation. This comes about because of the many places where grading demands taking top instead of bottom. Even for that short period of usefulness the bolts pay because of the working height they afford, the good roof-holding job and the more effective drilling for shooting when the strata are tied together. There is no recovery of usable bolts and channels when this top is shot down. A few scrap bolts are picked up.

### BOLT INSTALLATION

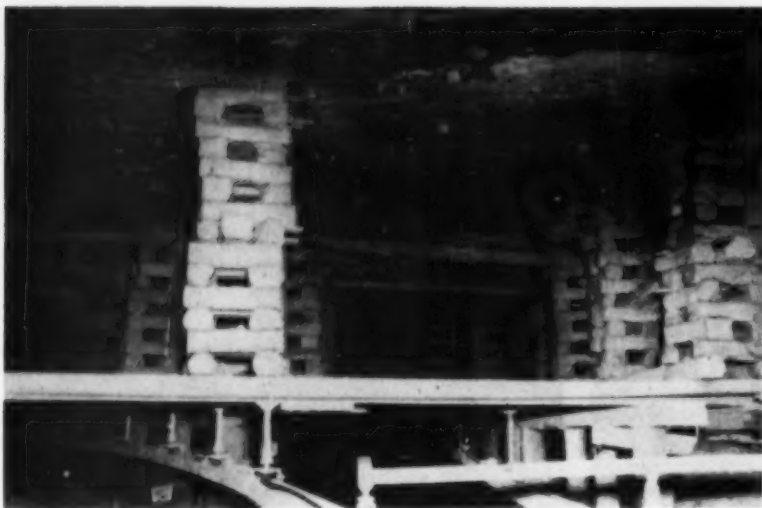
Bolt-hole drilling and hammering to seat the bolt over the wedge is done with stopers operated wet. Nut-tightening is done with impact wrenches. Bending channels to conform to unevenness of roof is done by jacking and nut tightening.

Compressed air for bolting and rock-shooting is provided by three underground compressor stations each supplying three crews using two stopers and one pair of mounted drifters. The last station installed has a 350-cfm V-6 water-cooled compressor driven by a 75-hp 440-v motor.

Piping from compressor stations to the points of grading and roof-bolting consists of main lines of 4-in steel pipe with bolted couplings and branches of 2-in threaded steel pipe to hose.

To insure that proper pressure is being maintained at the stopers and drifters, portable gages are used. The gage connection is a 20-gage hypodermic needle inserted into the stretched side of a kinked hose so that the puncture does not cause a leak.

Delay detonators are used in heavy rock shooting and each shot is tested with a galvanometer. In making deep cuts, holes are drilled 14 to 16 ft



**ALL-OUT SUPPORT** with cribs, bolts and crossbars at a junction point in bad territory.



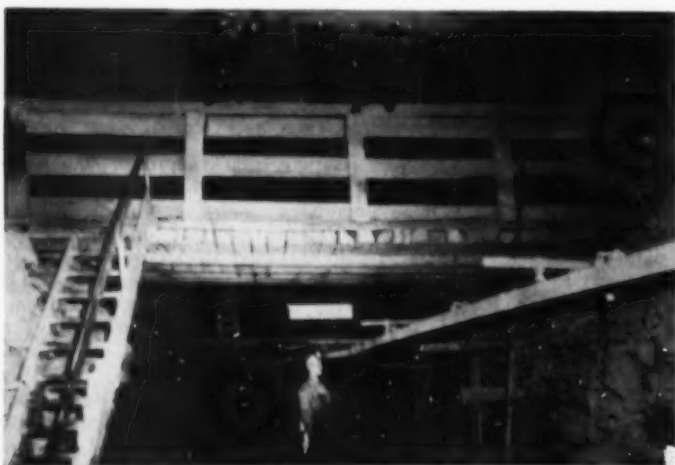
**BOLTING FAILURE** 60 ft from parallel heading holding firm 3 yr.



**MINIMUM APPLICATION**, principally 36-in bolts, has held 6,000 ft of main heading 3 yr.



**ROOF-BOLTING** arrests fall, via channels installed ahead for that purpose.



**HAULAGE OVERPASS**, with railing steadied by bolts, shows severity of undulations encountered.



**BOLTING CREW** at work on rock shot to raise track 16 ft above coal level.



**ROOF HOLDERS**—1x80-in bolts with 6-in burned slots for use with  $\frac{3}{8}$ x $\frac{3}{4}$ x5-in wedges driven home by air hammers.



**NEWEST** of three underground compressor stations—C. O. Carman, superintendent, left—features 350-cfm unit.

deep. Permissible explosive with a 55% strength is used.

Regarding the effects of coal shooting on the top, C. O. Carman, superintendent, who has been connected with the mine since before roof-bolting was started, says that no difference in roof action has been detected whether

the shooting is with permissible explosive or by other breaking methods. Earlier in this article it was noted that bad top, when out of control, falls about 21 ft in an entry 14 ft wide. Mr. Carman says that as a rule height of fall at the arch will be  $1\frac{1}{2}$  times the width of the place.

Others who have been close to the roof-bolting problem are W. D. Hawley, Glen White, who is general superintendent of several of the company's mines, including Stotesbury, and H. A. Quenon, Beckley, division manager, West Virginia low-volatile operations for EG&FA.



## The Chinese in Coal Mining

By THOMAS ALLEN, Chief Coal Mine Inspector, State of Colorado

**BLACK POWDER** was invented by Chinamen before the birth of Christ. They use it up to the present day for making firecrackers. In weird ceremonies, they explode huge quantities of these fireworks to scare devils away from men.

Centuries after the Chinese discovered and began to use black powder, coal mining was born. With the birth of the industry, black powder was introduced as a blasting agent. It still is used, whether in the old style granular or later pellet form, in large quantities in coal mines in spite of the known hazards.

The use of this explosive in coal mines, represents a reversal of the old Chinese custom. In other words, *men may be blasted to the devil* as a result of explosions caused by black powder.

China itself has made little progress as a nation mainly because the Chinese revere and hold onto the ancient practices of their fathers. Continued use of black powder, when modern and safer breaking mediums are available, might well be dubbed Chinese-ism in that it also denotes a lack of progress.

Possibly what might be called the Chinese influence in coal mining dates back to the introduction of Chinese labor into coal mines in the West in the early frontier days. That era ended in Rock Springs, Wyo., in 1885. Black powder, however, lingers on, and the purpose of this little discourse is to express the hope that it, too, will soon go—and with it the last of the Chinese influence on coal mining, whether in shooting or in any other phase of mining operations.





*Johnstown Tribune-Democrat photo.*  
1887—RICHARD T. TODHUNTER—Pennsylvania



1891—J. G. PUTERBAUGH—Oklahoma

## *The Half-Century Club*

**Seven careers epitomizing the contributions to coal-mining progress made by men whose periods of service go back as far as 1887.**

ANY INDUSTRY or business is a reflection of the men who operate it. In fact, the men, in the last analysis, are the industry—in coal mining as in all other lines of business endeavor.

Thus, coal mining today mirrors the efforts and the thinking of men of all ranks, both managerial and worker. The list includes those who are new and those who have had years of experience. It goes almost without saying that the longer the experience the greater the contribution to

progress than can be expected. By and large it works out that way, and coal is presently benefiting from careers of up to 50 yr or more.

Seven members of The Half-Century Club in the executive group are presented in the following columns. With services extending back as far as 1887, these men were still active in the industry at the time these data were compiled. Their contributions are evident from the details of their careers.

### **1887—Col. Robert B. Baker**

**President, Sterling Coal Co. and Stineman Coal & Coke Co., New York, N. Y.**

BORN IN LONDON, England, Jan. 1, 1867, the son of the industry—in coal mining as in all other lines of business Philadelphia, Col. Baker holds his title by virtue of his appointment as lieutenant colonel in the Pennsylvania National Guard by the late Gov. Hastings, in 1895. He was elected honorary life member in 1934. Col. Baker's paternal ancestor was Joe Baker, an Orthodox Quaker from England, who settled in Westport, Mass., in the 18th Century. On the maternal side, he is descended directly from Timothy Matlack, one of America's famous Revolutionary War characters.

Col. Baker entered the employ of Robert Hare Powel, of Philadelphia, in 1887, and continued with its successor, the Sterling Coal Co., advancing to secretary and treas-

urer in 1889, vice president in 1902 and president in 1906. One of Pennsylvania's most-progressive coal-mining companies, Sterling developed the series of mining operations centering around Bakerton, named in his honor.

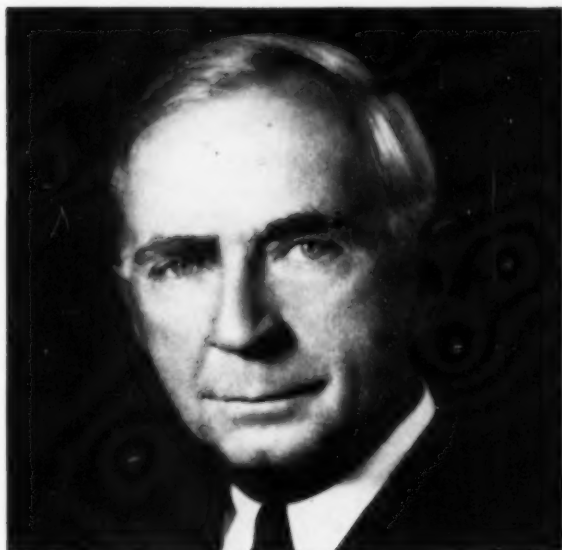
Col. Baker also is president and director of the Stineman Coal & Coke Co. and the Bakerton Supply Co. He was one of the organizers of the Powelton Barge Co., which operated a fleet of coal barges in New York Harbor for many years. One of his present keen interests is the New York Coal Trade Golf Club, which he helped organize.

### **1887—Richard T. Todhunter Sr.**

**President, Barnes & Tucker Co., Barnesboro, Pa.**

"I STARTED TO WORK with my father in 1887 in Atlantic No. 1 mine, between Kendrick and W. Moshan-





1899—DAVID INGLE—Indiana



1900—W. E. DAVIS—Kentucky

non, Clearfield County, Pa., as a trapper boy. This mine had some of the finest coal in the country—5½ to 6 ft with bony above and a very-good roof—if properly mined, as I realize now. At that time it was customary for each mule driver with a section to have a trapper. The ventilation was controlled by doors and there was a continuous air current. After working with my father for several years, I worked with my brother loading coal. I also did some driving.

"In 1894, I went to Edgewater, W. Va., and worked 3 mo for the Garver brothers. From there, I went to Black Diamond and worked for the Wyant Co. I then went to Claremont, on New River, and worked 1½ yr. This was shortly after the bridge at Thurmond was built across New River. I left Claremont and worked 5 mo at Collinsville for the Collins brothers—McKinley was elected this year. During this time I worked at almost every mining job.

"In 1899 I came back to Pennsylvania and worked at No. 16 mine of the Berwind-White Coal Mining Co., above Ramey, Pa. I then went to Brisbin and worked for a little over a year. From there, I went to No. 28 mine, near Janesville, Pa., and loaded coal until I got a job on a punching machine. I worked there 6 mo and passed my foreman's examination during that time. I then worked 9 mo for the George Laub Co., Brisbin. I then moved to Barnesboro, Pa., where I have been for the past 47 yr."

Mr. Todhunter has been an active advocate of mechanized mining, and his company was one of the first—if not the first—to employ mother belts in the bituminous industry over 20 yr ago. In 1950, as a result of a trip to England, he arranged for the installation of a Samson stripper and embarked on longwall mining at his Lancashire No. 15 operation.

### 1891—J.G. Puterbaugh

**President, McAlester Fuel Co., McAlester, Okla.**

MR. PUTERBAUGH'S connection with coal goes back to 1891, though it was not until 1902 that he entered the producing end with an interest in a small Oklahoma operation. He entered the retail business with his brother-

in-law, Emerson Carey, in Hutchinson, Kan., at the age of 15. He became a traveling salesman for the Western Coal & Mining Co., a subsidiary of the Missouri-Pacific R. R., in 1895, rising to the position of assistant general sales manager at St. Louis Jan. 1, 1902, at the age of 19.

Resigning a short time later, Mr. Puterbaugh organized the McAlester Fuel Co. March 1, 1902, which became the marketing company for some 15 mining companies in Oklahoma, Arkansas and southern Kansas. With general offices at McAlester, the company now has branch offices in Kansas City, Omaha and Minneapolis. Beginning about 1913, the company became a substantial producer through subsidiaries and now owns Bernice Anthracite Coal Co., Russellville, Ark.; Windsor Coal Co., Windsor, Mo.; and a substantial coal-land acreage in the McAlester district.

Growing loss of markets to fuel oil and natural gas beginning in the 1920s led to a decision to enter the oil business. This department of the company has grown until oil is now its most-important product from some 200 wells in southern Arkansas, east and west Texas and New Mexico. Mr. Puterbaugh, however, maintains a lively interest in coal production, and in the early years of World War II was active in establishing the fact that a combination of

### Nominations Wanted

The seven men whose careers are briefed in the accompanying columns represent only a part of those who have served the industry for 50 years or more. In presenting these members of The Half-Century Club, *Coal Age* asks for additional nominations from its readers so that all men with similar periods of service can be singled out for at least part of the honor that is due them.

Any man still active in a supervisory or managerial position who entered the coal industry 50 years or more ago is eligible for membership in the *Coal Age* Half-Century Club. Please forward nominations to: The Editor, *Coal Age*, 330 W. 42d St., New York 36, N. Y.



1902—JAMES A. McQUAIL—West Virginia



1903—H. B. SALKELD—Ohio-Pennsylvania-West Virginia

Oklahoma high- and low-volatile coals would produce an excellent metallurgical coke. This resulted in the construction of two steel plants in Texas operating on coke from Oklahoma coal and an additional substantial movement to steel plants in Colorado, Utah and California.

"This new market for Oklahoma coal," Mr. Puterbaugh reports, "is now absorbing most of the coal produced in the state as natural gas has made heavy inroads into all Midwest markets. Every power house in Oklahoma, Arkansas, Louisiana and Texas is now operating on natural gas, as are also all industrial plants, and gas is the accepted domestic fuel. Every railroad is using diesel-powered locomotives. As the market demand for coal has declined, we are fortunate to have turned to oil in 1931-32 and, as stated, that is now our principal business."

### 1899—David Ingle

**Ingle Coal Corp., Elberfeld, Ind.**

A LEADER IN THE DEVELOPMENT and introduction of the Joy loader and the first to open an all-loading-machine mine, Mr. Ingle entered the coal business as an engineer for the Ayrshire Coal Co., Oakland City, Ind., after graduation from Rose Polytechnic Institute and a year at Columbia University School of Mines. On the death of Mr. Ingle Sr. in 1909, he succeeded him as president of Ayrshire and of its successor, the Ingle Coal Corp. Prior to that time, Mr. Ingle and his father, among other innovations, started washing coal for coking in 1900 and installed electric shortwall cutters and locomotives in 1905.

An article describing a coal-loading machine invented by Joseph F. Joy prompted an investigation which resulted in the purchase of a loader and, in 1922, the complete equipment of a small operation started in 1916 with Joy machines. Because of the interest of operators in the Midwest, Mr. Joy decided to manufacture his machines in Evansville, Ind., and Mr. Ingle gave him considerable help in getting established in addition to lending his mines for considerable experimental work.

Mr. Ingle was one of the first directors and still holds that position with the Joy Mfg. Co. Over the years he has figured prominently in business and industry affairs, including the Indiana Coal Operators' Association, of which

he is a past president. He usually was on the Indiana scale committee and often on the scale committee of the old Central Competitive District.

### 1900—W. E. Davis

**President, Old King Mining Co. and Kentucky Sun Mining Co., Tribbey, Ky.**

A LEADER IN THE PIONEERING which resulted in the development of the Hazard coal field, Mr. Davis was born of Welsh parents at Knoxville, Tenn., Dec. 7, 1878, and graduated from Washington & Lee in June, 1899. Although he had worked summer vacations around the mines of the East Tennessee Coal Co., owned by his father, E. J. Davis, also operator of a retail yard in Knoxville, he started his career as head of the mathematics department at the New Mexico Military Institute. When his father decided to visit his native Wales in 1900, he was called back and soon was in charge of the East Tennessee company's operations at Jellico, continuing as mine manager until the Jellico seam was exhausted about 1912.

Meanwhile, however, the Blue Gem seam was opened on the same property and at about the same time the East Tennessee company began equipping a mine in the high-grade Straight Creek seam, near Pineville, Bell County, Ky., which was bought out by the lessors before a pound of coal was produced. In this period, also, Mr. Davis began a series of trips into Perry County, Kentucky, leading to extensive operations in what is now the Hazard field. At that time, both the L. & N. and the C. & O. were pushing their lines in to develop the Elkhorn-seam area.

"My first trip into Perry County," Mr. Davis remarks, "was accomplished by two days of hard muleback riding from Pineville to Hazard. A few weeks later I went by train to Norton, Va., and there hired a horse for a ride through what is now Jenkins in the Elkhorn-seam area and down the Kentucky River into Hazard—another two-day ride. The next trip into Hazard was made by train to Jackson and thence by muleback to Hazard—about a day-and-a-half ride. The L&N construction was quite advanced toward Hazard when I made this last muleback ride."

## ***The Half-Century Club . . . 50 Years or More in Coal Mining***

The fruits of this pioneering and later development included:

**1913**—Negotiation of a lease for the East Tennessee company 5 mi above Hazard and development of the Glomawr mine, later sold and the last East Tennessee company mine, though it continues as a coal wholesaler under the direction of a brother, H. J. Davis.

**1915**—Negotiation of a Hazard-coal lease on a new L&N branch being built from Typo (the First Creek branch) in the name of the First Creek Coal Co. The mine was equipped with some of the first dropbottom cars developed by Charles A. Griffith, Pruden Coal & Coke Co., and the Sanford-Day Iron Works. "And we proved their economy in mine operation. Incidentally, we had a few 'bugs' to work out. But it is the only kind of mine car I have bought since that day." First Creek was later sold and exhausted by other interests.

**1917**—Negotiation, with the late Harry E. Bullock, of a lease of No. 7 coal on Jakes Fork of the Lotts Creek branch of the L&N, then being built. The Midland Mining Co. was organized to equip and operate the mine, and continues to do so through the Old King Mining Co. Kentucky Sun, of which Mr. Davis also is president, operates a mine near Combs, 3 mi west of Hazard.

**1924**—Organization, with Cincinnati and Knoxville associates, of the Davis Collieries Co., of which Mr. Davis also is president, and purchase of a mine at Butterfly, 14 mi west of Hazard, exhausting the coal in a few years. About 1928, the company, now inactive, bought a half interest in the Midland organization.

**1940**—Acquisition, with his sons, of an interest in the Peewee Coal Co., headed by Frank Garland, opening a mine since sold. Peewee, incidentally, sued the federal government and won damages as a result of wartime seizure.

**1948**—Acquisition of a large lease formerly held by another company adjoining the Midland holdings (Old King No. 1), now operated as Old King No. 2.

Other eastern Kentucky mining operations in which Mr. Davis is interested are: Kenmont Coal Co., mine at Jeff, 7 mi east of Hazard; and Clear Branch Mining Co. and Beaver Coal Mining Co., Big Sandy area. Other past interests in the Hazard area have included: Carbon Glow, Rock House Creek; White Oak Creek area, left side of Carrs Fork, formerly operated by the Defiance Coal Co.; Kentucky Colonel, now exhausted, Blackey, Ky.; Blue Bird Coal Co.; Yellow Creek; and Black Gold Co., Lothair.

Four of Mr. Davis' five sons and one daughter still survive, with the second old, Finley, in charge of coal sales through the Midland Coal Corp. Mr. Davis is a 32° Mason and has been active in Masonic bodies for about 50 yr. He has been an elder in the Southern Presbyterian Church (U.S.) for 46 yr, starting at Jellico, Tenn.; then Hazard, and now the First Presbyterian Church at Lexington, Ky., his present residence.

### **1902—James A. McQuail**

**President, Turkey Gap Coal & Coke Co.,  
Dott, W. Va.**

MR. MCQUAIL STARTED WORK in the general office of the Turkey Gap Coal & Coke Co., at Ennis, W. Va., in 1902. He was elected secretary and treasurer in 1913, holding those positions until 1924. Upon the death of his

brother in that year, Mr. McQuail was elected general manager, becoming president in 1925.

The original Turkey Gap lease at Ennis was exhausted in 1926, and the company is at present working the Pocahontas No. 3 seam at Dott, having taken over the Wenonah Coal & Coke Co. in 1913 and the Modoc Coal Mining Co. in 1917, at the same time leasing additional acreage now being mined.

Other positions held by Mr. McQuail were: secretary and treasurer, Ennis Coal Co., Hiawatha, W. Va., 1913-24; president, 1924-36; treasurer, The American Coal Co. of Allegany County, McComas, 1920-24; treasurer and general manager, 1924-26.

Turkey Gap has long ranked as one of the outstanding operations in the field. As Mr. McQuail, puts it, it "has had its share of success for which I do not take all the credit. Giving credit where credit is due, the success I have had is due in great measure to my association with my father, W. H. McQuail, and my brother, Edward J."

### **1903—H. B. Salkeld**

**President, Tasa Coal Co., Zelenople, Pa.**

A PIONEER in the development of strip mining in the East, Mr. Salkeld was born in Lloydsville, Pa., Sept. 1, 1880, son of Samuel Scott Salkeld, grocer, and Etta (Sipe) Salkeld. He was educated in the Steubenville (Ohio) high school and Steubenville Business College.

After working as a clerk and teacher, Mr. Salkeld entered the coal industry as office manager for the Kirkbride Coal Co., Carnegie, Pa., successively holding the following positions: office manager, Ft. Pitt Stone & Brick Co.; office manager, sales agent, vice president and treasurer, Verner Coal & Coke Co.; vice president in charge of operations, Carnegie Coal Co.; president, treasurer and director, Tasa Coal Co., 1917 to the present time; president and director, Shirley Gas Coal Corp., Freemont Coal Co., Hopedale Coal Co., Harmon Creek Coal Co.; Pocono Land Co., Beverly Heights Co., Canyon Coal & Coke Co. (now merged with Tasa), Hitchman Coal & Coke Co. and Coal River Mining Co., both controlled by Tasa.

The Hopedale Coal Co. was formed with John A. Bell in 1916, and was the second strip operation in Ohio. Mr. Salkeld has been continuously in deep and strip mining since that time. Tasa was organized by George Taylor, Erie, Pa., son of M. H. Taylor, former chairman of the board, Pittsburgh Coal Co.; A. G. Schneidhelm, also of Erie, and Mr. Salkeld. Tasa gets its name from the first two letters of the last names of Messrs. Taylor and Salkeld.

In 1902, following a recommendation by Mr. Salkeld, the chief engineer of the Pennsylvania R.R. lines west had wide-carriage typewriters made for journalizing construction work and effecting a substantial saving in labor and time. Mr. Salkeld also was active in the development of Mt. Lebanon Township, Allegheny County, Pennsylvania. About 1920, one of his associates in Mt. Lebanon development was Sen. James H. Duff. Mr. Salkeld served as director of the Marine National Bank and the Third National Bank, of Pittsburgh, and was one of the organizers of the Mt. Lebanon Bank, serving as president and director until its merger with the Commonwealth Trust Co.

Mr. Salkeld also was commissioner of Mt. Lebanon Township for 8 yr (president and vice president of the board). He is a 32° Mason, K. T., Shrine, and is a member of the Presbyterian Church.

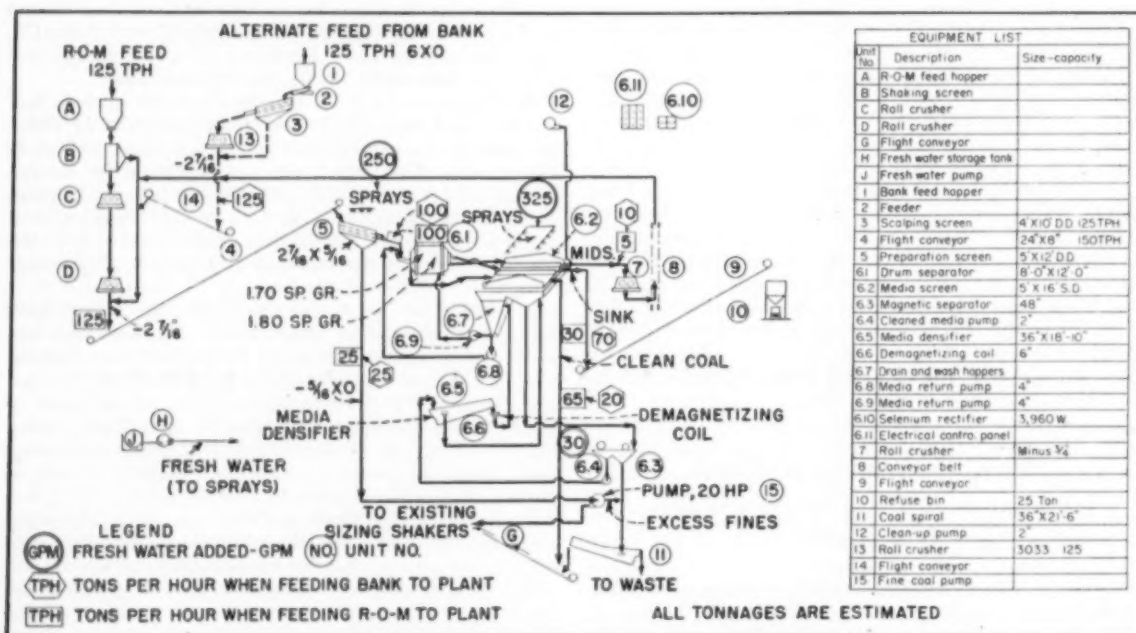


**TWO-COMPARTMENT DRUM** is the focal unit in Beaver Brook's simplified dual-gravity cleaning plant. Float material in the low-gravity compartment is clean coal, shown in the right photo leaving the drum separator.

Dual-gravity separation in a single vessel is the big feature of . . .

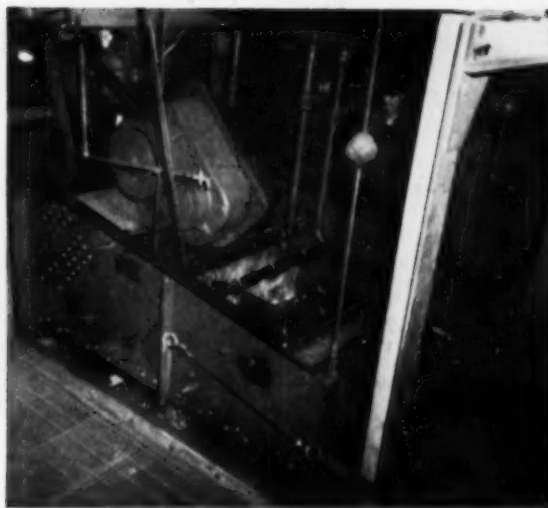
## Beaver Brook Heavy-Media Plant

A double-duty 8x12-ft drum-type separator makes an initial separation at 1.70 sp gr and another at 1.80 to provide a middlings product which can be crushed and recirculated to obtain maximum yield.



A LONE PLANT OPERATOR is the only attendant required to operate the simplified circuits shown in this flowsheet.





**PREPARATION SCREEN** (left) splits raw-coal feet at 5/16 in to provide 2 7/16 x 5/16-in for heavy-media cleaning. Media screen (right) exposes drum products to spray water to wash off magnetite.

**DUAL-GRAVITY SEPARATION** of sizes from stove through buckwheat in a single vessel is one of the latest developments in anthracite preparation practice. Proud owners of the new installation, Beaver Brook Coal Co., McAdoo, Pa., report that their Wemco Mobil-Mill with a two-compartment drum separator rated at 100 tph, is satisfactorily converting feed from deep strippings or banks into three fractions: (1) clean Lehigh anthracite, (2) stripped-clean refuse and (3) a middlings product which is crushed and recirculated through the drum of the Mobil-Mill to insure highest possible yield from the feed.

Furthermore, the new plant at the company's Redco colliery features a medium-reclamation system which is equipped with only a single magnetic separator and a single densifier. Thus, the two-compartment drum contributes to more economical operation in three important ways: fewer pieces of equipment are needed, construction and installation costs are lower and a minimum of floor space is required.

In preparing coal from seams in the Eastern Middle Field such as the Gamma, Lykens, Buck Mountain, Wharton and Mammoth, Redco colliery turns out a product that is well within Standard Anthracite specifications. The company is owned and operated by George Huss, managing partner, and his brothers, Russell and Wesley. E. M. Dormer is superintendent.

As in other Wemco Mobil-Mill installations, the heavy-media circuit is a packaged unit inserted between the company's own feeding equipment at one end and sizing and loading equip-

ment at the other. At Redco, two feed circuits are provided, one for fresh-mined raw coal and the other for raw coal from banks. The fresh-mined feed, containing about 25% reject, is fed through breaker rolls, but the bank feed, containing about 70% reject, is broken in a crusher. In both instances, the feed is reduced to minus 2 1/4 in, or stove size and smaller.

As shown in the flow diagram, feed from either source is elevated by a 24x8-in flight conveyor to the preparation screen, which is a double-deck, 5x12-ft Allis-Chalmers Rip-Flo sloping at 15 deg. The underflow of the preparation screen, 5/16x0, by-passes the drum separator and is directed for cleaning to an adjacent plant equipped with two hydrotators, a hydrotator-classifier and two wet tables. The remainder of the feed, 2 1/4x5/16 in, is chuted from the preparation screen to the low-gravity compartment of the drum, which is maintained at 1.70 sp gr.

#### HOW THE DRUM OPERATES

The separation is accomplished as follows:

As the drum rotates, the sink material in the low-gravity compartment is lifted out of the water-and-magnetite suspension by sink lifters attached to the inside surface of the drum and dropped into a trough which discharges into the high-gravity (1.80) compartment. The float material in the low-gravity compartment is clean coal, the final product.

A portion of the high-gravity medium is introduced through this internal trough to sluice the low-gravity

sink into the high-gravity compartment. In the high-gravity compartment another separation is made, with the float consisting of the middlings and the sink being the final refuse.

The three products, clean coal, middlings and refuse, are sluiced to a 5x16-ft Allis-Chalmers Low-Head media screen, where 325 gpm of fresh spray water washes the non-draining medium from the products. As shown in the illustration, the screen surface is divided into three longitudinal sections, one for each product of the drum.

The middlings consists of closely banded coal and high-ash impurities. Although the coal portions of this "cap coal" is of good quality, the combined coal and impurities will not float at 1.70. It is separable at 1.80, however, and the coal can be broken out of the impurities by crushing.

Therefore, the middlings is crushed to minus 3/4 in after being washed free of magnetite on the media screen and the crushed material is returned to the plant feed conveyor via a 24-in belt conveyor for recirculation over the preparation screen and through the drum.

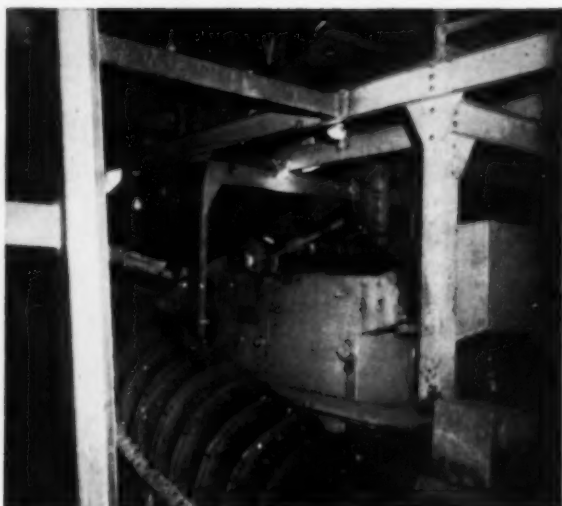
Clean coal is chuted to a flight conveyor which elevates the coal to the adjacent plant and discharges to the sizing shakers. Refuse is conveyed to an elevated truck-loading 25-ton hopper outside the plant.

#### RECLAIMING MAGNETITE

The medium-reclamation system, like the dual-gravity drum, is designed for simplicity. The goal is to polish the magnetite and return it to the



**TWO-COMPARTMENT SUMP** under drain-and-wash screen keeps low- and high-gravity media separated.



**MAGNETIC SEPARATOR** (background) cleans magnetite which drains from all products, coal, middlings, refuse.



**FRESH-MINED COAL** from Beaver Brook strippings is hauled to the plant feed chute as shown in the left photo, and refuse is returned to the worked-out strip pits in the company's dump trucks.



**E. M. DORMER** (right), superintendent, and Joseph Mehalick, plant operator are responsible for smooth, productive cleaning at Redco colliery.

sumps while employing the least possible number of auxiliary units in getting the job done.

At Redco, the major units in the reclamation system are one 36-in by 18-ft Wemco densifier, one 48-in Dings magnetic separator and the single media screen divided longitudinally into three sections, as previously mentioned.

The medium is cleaned as follows:

Over the first part of the media screen the free-draining suspension of magnetite and water drops into separate compartments of a two-compartment sump. One compartment is under the coal portion of the screen to receive the low-gravity medium and the other compartment is under the refuse and middlings portion of the screen to receive the high-gravity medium. The media are pumped from

these compartments to their respective compartments of the drum separator by two 4-in Wemco pumps.

Fresh-water sprays over the discharge half of the screen wash the non-draining medium to a non-partitioned hopper and then to the magnetic separator. The cleaned medium is pumped by a 2-in Wemco pump to the densifier, and the densified medium flows through the field of a demagnetizing coil back to the two-compartment sump for reuse in the drum. Overflow of the densifier flows to the non-partitioned hopper for recirculation through the reclamation system. The densifier is installed on the operating floor above the hopper and sump under the media screen.

#### HANDLING FINE COAL

Returning to the magnetic separator, the underflow of this unit, containing fines from which the magnetite has been recovered, is piped to a 36-in by 21½-ft Wemco coal spiral. The overflow of the spiral is rejected and the product is carried in a flight conveyor to the sizing shakers.

As shown in the flowsheet, the underflow of the preparation screen, minus 5/16-in raw coal, is pumped to the sizing shakers by a 5-in sand pump, the pump and spiral complementing each other in moving the fines to the shakers.

The 2 7/16x5/16 clean coal is sized and loaded as standard stove, nut, pea and buckwheat anthracite.

The minus 5/16-in raw coal is sized into rice, barley and finer fractions for cleaning in the hydrotators, hydrotator-classifier and tables.

The Mobil-Mill packaged unit represents a total connected load of 97¼ hp, with an added load of 116 hp at the fine-coal pump, feed conveyor, refuse conveyor and so on. The magnetic elements are provided with DC through a 3,960-w selenium rectifier. The Mobil-Mill and auxiliaries are controlled from a Cutler-Hammer automatic control station.

The Philadelphia & Reading Coal & Iron Co. is the exclusive sales agent for the coal produced at the plant. It is marketed under the "Redco" trademark.



## A Is for Anthracite . . .

CAN YOU LIST a use for anthracite for every letter of the alphabet?

Miss V. I. Schlacks can. She's advertising manager, The Philadelphia & Reading Coal & Iron Co., Philadelphia. She read a paper

at the recent tenth annual Anthracite Conference of Lehigh University. In that paper she rattled off an alphabetical listing of anthracite uses from A to Z. Here's her list, whittled down:

**A**—Activated carbon in gas masks and color remover in sugar plants.  
**B**—Blast furnaces; brick manufacturing; briquets.  
**C**—Cement manufacture; coke upgrading; crop drying.  
**D**—Dynamite manufacturing as a filler.  
**E**—Electric-power generation.  
**F**—Filtration in place of sand; food-industry hydrogen source.  
**G**—Gas producers.  
**H**—Hematite reduction to metallic iron.  
**I**—Ink drying in the publishing industry.  
**J**—Jet-propulsion research on oxygen production.  
**K**—Kilns for cement clinker.  
**L**—Lead-ore reduction; lead oxide for paints.  
**M**—Malt drying for beer making.  
**N**—Nitrogen production by catalytic conversion for fertilizers.  
**O**—Ore reduction.

**P**—Paint pigments, replacing metallic oxides.  
**Q**—Quarry products, notably lime burning.  
**R**—Recarburization to increase carbon content of molten metal.  
**S**—Sintering fine ores, shales and clays by fusion.  
**T**—Telephones as pulverized carbon particles; tobacco curing.  
**U**—Underfeed stokers for heating and steam generation.  
**V**—Vanadium-ore reduction in electric furnaces to make alloy steels.  
**W**—Water purification.  
**X**—Xerography, a dry-photo process using copper plates and micronized anthracite.  
**Y**—Young-Whitwell backrun process in manufacture of gas from solid fuels.  
**Z**—Zinc oxide production through reduction of ore.





**NEW PREPARATION PLANT** at Lady Dunn Mine No. 100 is designed as a central washer. Plans call for a belt conveyor for barge loading on the Kanawha River (left). Levelled area provides for storing 500,000 tons of washed coal.

## Modernizing Cannelton

**How new central preparation plant is set up to complement new mining operation producing metallurgical-grade coal for Canadian steel plant, with provision for rail and river transportation and stocking and sale on open market when Lakes are closed.**

A RESERVE of 16,000 acres with an estimated 100,000,000 tons of coal still to be mined explains why the Cannelton Coal & Coke Co. recently built a 450-tph preparation plant at the old mining town of Cannelton, W. Va., where coal has been mined for nearly a century. This new plant, in the Kanawha Field, is at Lady Dunn Mine No. 100, for which preliminary development was begun 5 yr ago with the coal handled over a temporary tippie. Full-seam mining is the practice, track haulage is used and the trolley installation is of the new inverted type.

The new plant crushes to 5 in., washes the entire mine output in one Baum-type jig, includes an extra-large settling tank doing an outstanding job of clarifying the water, and is equipped with improved centrifugal driers which reduce total moisture of the  $\frac{1}{4} \times 0$  coal to 7%. Tonnage from the plant is semi-captive.

Cannelton Coal & Coke Co. is a wholly owned subsidiary of the Al-

goma Steel Corp., Ltd., of St. Marie, Ontario, Canada. Sir James Dunn, Bt., Q.C., of that city, is president of the companies, including the Lake Superior Coal Co., another wholly owned subsidiary operating in the Pocahontas No. 3 and No. 4 seams in McDowell County, West Virginia.

The new mine was named for the wife of Sir James who, as the initials following his name indicate, is a Baronet and a member of the Queen's Counsel. F. O. Harris, Cannelton, is vice president and general manager, B. C. Hylton is general superintendent, P. W. Damon is chief engineer, and S. R. Wolfe is chief construction engineer. Mr. Wolfe represented the coal company in the construction of the new plant, handled by the Kanawha Mfg. Co., which did the design and contracted the construction.

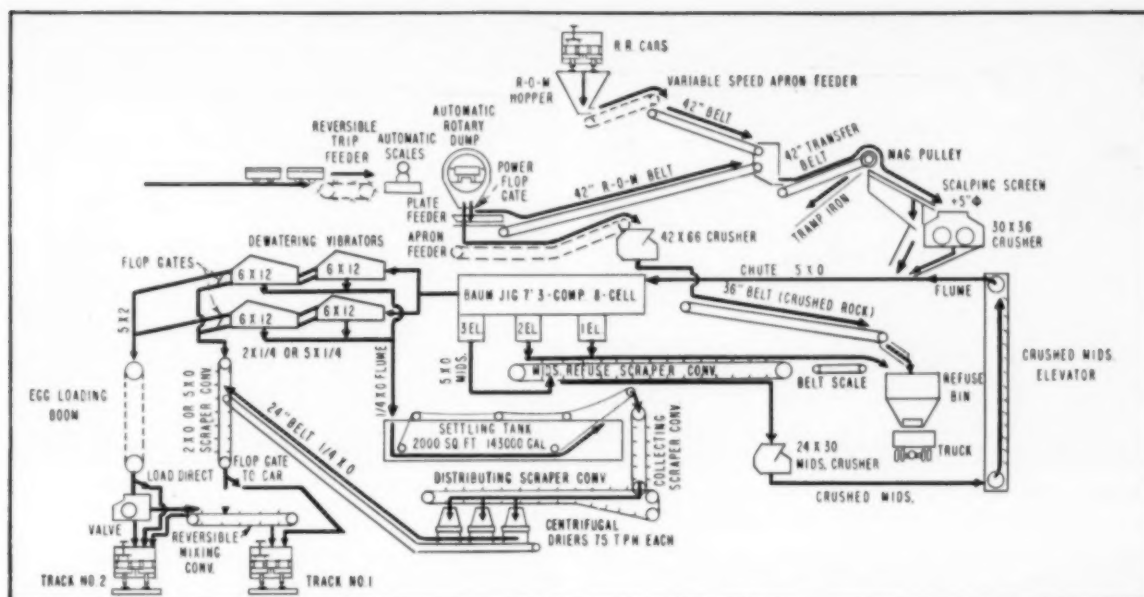
### CANNEL ORIGINALLY MINED

Cannelton is on the Kanawha River and U. S. Route 60, 25 mi southeast of Charleston. Mining of an exception-

ally high-volatile cannel coal from a seam 700 ft above the river started there sometime before 1857 and transportation of the coal to coal-oil processing plants was by boat. In 1872 or 1873, soon after the C. & O. Ry. was built, facilities were installed to ferry the mine cars across the river for loading to that railroad at a station named Cannelton, which grew into the present city of Montgomery. Later a railroad (N.Y.C.) was built on the other side of the river and through the original Cannelton. The new Lady Dunn Mine No. 100 is served by this N.Y.C. line and soon will have facilities for loading to the river also.

About 1858, cast-iron retorts were installed at Cannelton to make 50 bbl per day of "crude oil," which was river-shipped to Maysville, Ky., where it was refined to make coal oil, corresponding to kerosene now made from petroleum. This coal-oil business passed out about 1868, presumably because of the discovery of natural petroleum. The next market for the

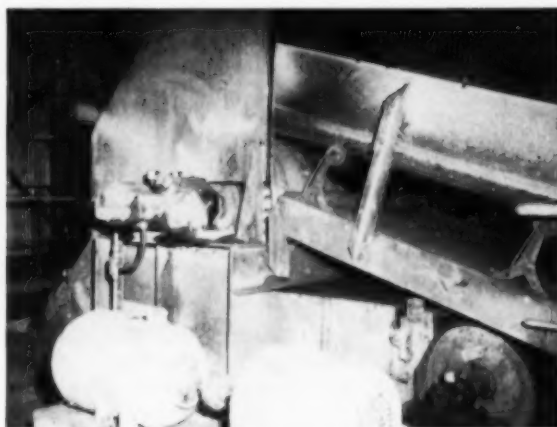




**HOW METALLURGICAL-GRADE COAL** flows through the new preparation plant at Lady Dunn Mine No. 100, equipped to wash, dry and load to either rail or river transportation facilities.



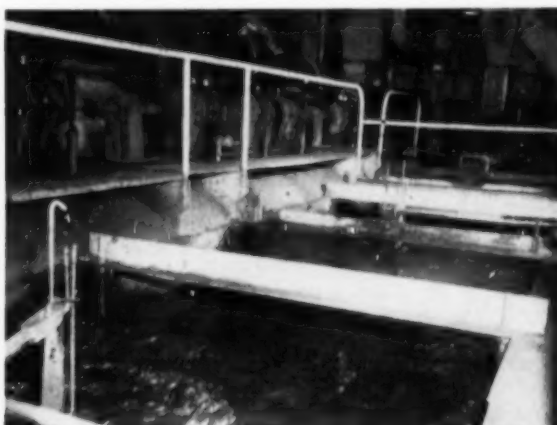
**NEW MINE CARS** are dumped entrain and can be handled at a rate of three per minute. Car capacity is  $5\frac{1}{2}$  tons.



**MAGNETIC PULLEY** on transfer belt eliminates tramp iron as R-O-M coal is discharged to crusher after scalping.



**DOUBLE-ROLL** 30x36-in crusher reducing R-O-M to minus 6 in for washing is driven by a 100-hp motor through V-belts.



**ENTIRE PLANT FEED** after reduction to 5 in is washed in this 3-compartment 8-cell Baum-type jig.



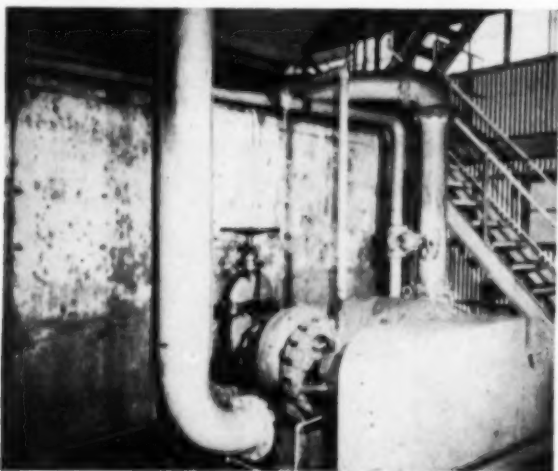
**MIDLINGS ARE CRUSHED** in this 24x30-in single-roll unit and then are returned to the washer feed.



**CONCRETE SETTLING TANK** on the ground floor of the plant is 100 ft long and provides 2,000 sq ft of settling area.



**SETTLING-TANK BEACH.** The tank has a capacity of 143,000 gal. Width of the conveyor is 20 ft.



**CIRCULATING PUMP** with a capacity of 3,200 gpm is at beach end of tank and is driven by a 75-hp motor.

cannel coal was as an enricher in making illuminating gas but that market began to pass out about 1892, also, it is presumed, because petroleum was introduced as an enricher and electricity began to displace gas lighting.

Lady Dunn Mine No. 100 is in the No. 2 Gas seam lying at tippie height. Limited mining was begun in that seam back in the coal-oil days. The present owners bought the original Cannelton (one tract in Kanawha and Fayette counties) July 1, 1910, from the Cannelton Coal Co. of W. Va., which had been organized in 1871 to take over the previous interests.

Collis P. Huntington, builder of the C. & O. Ry., owned an adjoining 9,200 acres which remained unmined and, through his will, passed to the Mariners' Museum, at Norfolk, Va. A few years ago when the Cannelton Coal & Coke Co. leased that virgin acreage and brought its total holdings

to 16,000 acres it formulated the plans which culminated in the new mine and plant. In addition to the No. 2 Gas seam the property carries the following minable seams: Eagle, Winifred, Coalburg, Stockton-Lewiston and No. 5 Block.

#### **WASHING CENTRALIZED**

The new plant, which is a central washer for the several mines of the company, is now handling coals from both the Eagle and No. 2 Gas seams with a total reject of 25 to 30%. The impurities include slate partings and laminated bone and sand rock top, which is taken down for entry development. Actually some of the mine cars dumped as coal carry 90% reject. The goal of the plant is to ship a cleaned product of 6% ash and this is now being achieved most of the time.

The plant includes facilities for dumping railroad coal from any other

mines on the property, and also purchased coal. The surface tract for the washer is adjacent to the river and includes considerable swamp land, the filling of which will accommodate the plant refuse for many years. Sufficient land already has been leveled adjacent to the plant to permit stocking 500,000 tons of washed coal. During the winter when the lakes are closed to navigation, thus stopping shipment by water to the parent steel plant, some of the Cannelton Coal & Coke Co. tonnage is sold on the open market and the remainder is stocked at the mine.

#### **Lady Dunn Preparation**

Solid-body steel cars carrying 5½ tons from Lady Dunn Mine No. 100 are handled entrain by a reversible car feeder over a Toledo Printweight automatic scale and through a Kana-

wha rotary dump. Present dumping speed is 500 tph. However, 3 cars per minute could be dumped for a tonnage of 900 per hour. The dumphouse equipment includes a Jeffrey 42x66-in Flextooth crusher intended for crushing rock for belt transportation to a truck-loading hopper bin in the plant, as shown on the flowsheet. The conveyor gallery, extending over Route 60 from the dumphouse to the plant, houses two conveyors, one a 42-in unit intended for run-of-mine coal and the other 36-in for conveying the crushed rock.

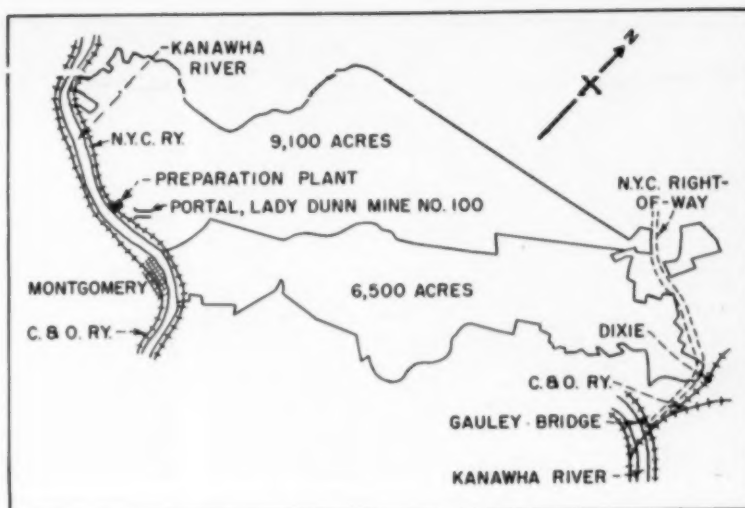
At present, because of mining conditions encountered and some experimentation, no selection at the dumphouse is being made between cars consisting primarily of coal and cars that are largely rock. All the material goes over a 10-in grizzly, with the oversize through the Flextooth crusher for reduction to 10 in and the reassembled product conveyed to the tipple on the 42-in belt. This altered plan of handling the raw material is not included in the flowsheet because it may be only temporary.

#### WASHER MAKES THREE PRODUCTS

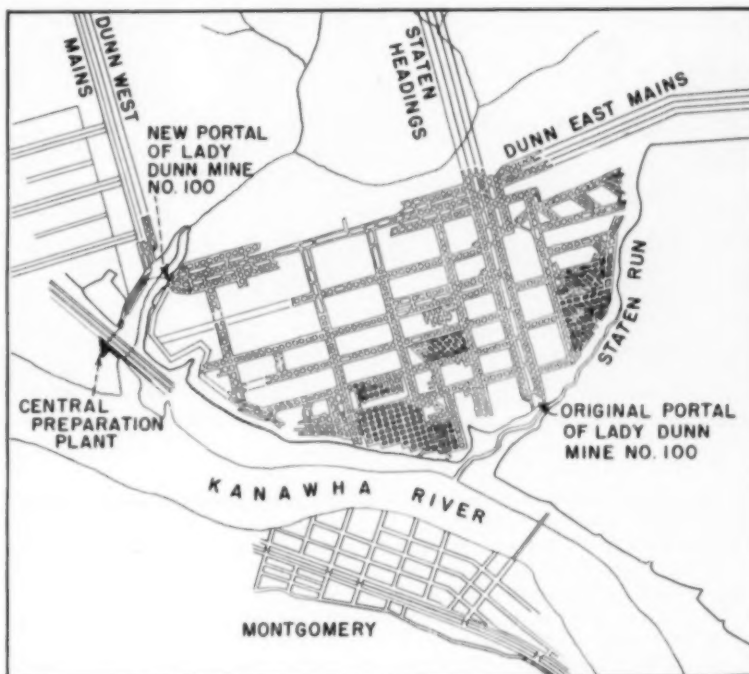
The 10-in raw product goes over a Stearns magnetic pulley to a grizzly which diverts the plus 5-in through a Jeffrey 30x36-in double-roll crusher. The reassembled 5x0 goes to the Jeffrey 7-ft 3-compartment 8-cell air-operated Baum-type jig which washes at 1.60 gravity and makes three products; clean coal, middlings and refuse. The latter, after being reduced to 2-in in a Jeffrey 24x30-in Flextooth crusher, is recirculated to the jig. Tests on the final refuse show 0.5% float at 1.60 gravity. This float material is practically all less than 1/2 in.

Dewatering and sizing screens are Allis-Chalmers 6x12-ft Low Heat units arranged two in tandem. The flow is split between two tandem pairs. The 5x2 drops to a loading boom for direct loading on Track No. 2 or for diversion through a crusher. The crushed product can be loaded through a chute on Track 2 or mixed with the 2x0 or 5x0 and, by means of the mixing conveyor, which is reversible, loaded through chutes on Tracks 1 or 2. Cars are handled by Brownie HKC retarders rated at 12,000-lb rope pull at 50 fpm.

Water carrying the 1/4x0 from the four dewatering and classifying vibrators, which are equipped with 1/4-in cloth on the front section and 3/16-in on the other two sections, goes to a concrete ground-floor settling tank holding 143,000 gal and providing 2,000 sq ft of settling area. For 80 ft, beginning at the intake end, the



HOW THE NEW PLANT IS LOCATED with respect to coal reserves, present development in the No. 2 Gas seam at Lady Dunn Mine No. 100 and, cross-hatched at the right, a worked-out section of the old No. 1 mine in the No. 2 Gas.



COAL-PROPERTY LENGTH is approximately 11 1/2 mi. The 6,500-acre tract is the original Cannelton property. The 9,100-acre tract was leased from the Mariners' Museum.

tank is equipped with under-water wooden baffles on 3-ft centers. Originally, these extended from wall to wall but later were cut to leave 6-in clearances at the side walls. This change was made to prevent solids building up at the sides and overloading the conveyor.

#### FINES DRIED TO 7%

Three Model E 36 CMI centrifugal

driers are reducing the moisture of the 1/4x0 recovered by the settling tank to a total of 7%. R. W. Nestor, preparation superintendent, credits this excellent performance in part to the smooth fracture characteristic of the coal. Inherent moisture of the coal is 1.5 to 2.5%. When the washed 5x2 is crushed and mixed with the 2x1/4 and centrifugally-dried 1/4x0 for shipping the plant output as 2x0, as is



**DEWATERING AND CLASSIFYING** vibrators — two in series for tandem operation and two tandems in parallel.



**THREE NEW-TYPE CENTRIFUGAL DRIERS** dewater  $\frac{1}{4}$ x0. Total moisture in the dried product is reduced to 7%.



**ROY LUTES**, chemist, holds away in the laboratory which is on the ground floor of the plant.



**N. G. CLONCH** (left) is assistant to R. W. Nestor, plant superintendent. Their office is on the ground floor.

the practice a large part of the year, total moisture runs  $3\frac{1}{2}$  to  $4\frac{1}{2}$ %.

Effluent from the driers goes back to the settling tank. By reason of the great size of this tank very little coal is lost in the continuous overflow, which is adjusted to 150 gpm. Approximately 80% of the solids in the waste water consists of minus 325-mesh material. Of the remainder, at least 90% is minus 100-mesh. The waste solids contain 17% ash.

One circulating pump serves the plant. It is an Allis-Chalmers 12x10-in unit rated at 4,500 gpm, 50-ft head, at 1,160 rpm. The drive is a 75-hp 440-v 1,160-rpm motor.

Screens of the centrifugal driers are changed after six days of two-shift operation. They may not be worn out by that time but it pays to renew them because of the blanking that takes place and because otherwise holes might develop and cause a drop in

drying efficiency. Mr. Nestor explains that stainless screens would not pay because blanking of screens takes place long before the stainless would show serious wear.

Drier screen changes which originally required over  $2\frac{1}{2}$  hr have been cut to 25 min by special equipment added for the job (p 122 of this issue).

Principal low-speed bearings of the plant have been equipped with wick oilers which are proving efficient, are saving lubricant and have reduced labor (p 124 of this issue).

Reject from the jig is weighed automatically on a Merrick Weightometer belt scale. This material, now amounting to approximately 1,200 tons per two-shift day, is hauled  $\frac{1}{4}$  to  $\frac{3}{8}$  mi to the swamp area. Equipment consists of four 20-ton diesel trucks, three GMC and one International.

#### DESIGN FOR LOW COST

The plant structure is designed for long life and low maintenance. The framing is steel and the floors are steel checker plate except for concrete for the ground floor. Sides are covered with corrugated galvanized steel and the roofs with gypsum slabs topped with built-up lifetime roofing. Heating is by low-pressure steam distributed to Trane unit heaters.

Principal motors of the plant, including the dumphouse, total 44. The connected horsepower is 1,271. Practically all motors are General Electric and GE also furnished the indoor-type unit substations (4,160 to 440 v) and their Cabinetrol switching and starter panels. The headhouse substation is rated at 300 kva and the tipple unit at 1,000 kva.

On the ground floor of the main plant, a 15x30-ft room sealed against dust and fitted with sound-absorbing





**UNIT SUBSTATIONS** reduce voltage from 4,160 to 440 and include feeder switches and starters.



**PLANT OUTPUT IS LOADED** on two tracks, with provisions for mixing on both and for crushing on one.



**DIESEL TRUCKS** with a capacity of 20 tons haul the plant refuse  $\frac{1}{2}$  mi to a swampy area being reclaimed.

ceiling houses the preparation-plant office and a laboratory. Ash and moisture tests are made regularly and some float-and-sink tests are run. Equipment is on order to determine sulphur percentages.

Plant operation and maintenance are facilitated by a 10-station Femco speaker system, with one speaker in the mine-car dumphouse and another at the railroad car-dump hopper. An aid to low maintenance is a large-amperage wiring system conducting welding potential from a central motor-generator welder to stations in the main plant and the dumphouse.

Railroad-car capacity for the plant is 60 cars above the tipple and 8 under the tipple. The loaded track can accommodate 80 cars. Empties from the dumping of coal received by railroad move to the No. 1 tipple loading track. The New York Central serves this mine twice daily.

### Lady Dunn Mine No. 100

Pushing development, doing some room work and taking pillars at the same time in line with the goal of total mining with at least 90% recovery, all with an eye to getting production while determining the best equipment for the property, characterize the work to date in Lady Dunn Mine No. 100. A variety of face equipment is now in use and what type or types will be expanded as the standard has not been determined.

Seam thickness averages 42 in but there is a wide variation in conditions, especially in the character and amount of top material taken down to gain height for haulways. Equipment now in the mine consists of five Jeffrey L-600 loaders, three Whaley Automats, five Jeffrey 29U cutters and two Jeffrey mounted electric coal drills (all for track work); and one Joy 12-BU

loader, one 20-BU loader, one Joy RB cutter and two Joy 8-SC shuttle cars for off-track mining. Considerable roof bolting is done, mostly in headings but some in rooms and pillar work. Equipment for bolting consists of two machines for rotary electric drilling and one for percussion drilling.

Four-heading main entries and three-heading room entries constitute the mine layout. Haulage portals are at tipple elevation and on opposite sides of a hollow 700 ft from the dumphouse. A Jeffrey 5-ft Aerodyne fan is handling the ventilation of the operation.

### TROLLEY INVERTED

Mine power is 275-v DC. Trolley wires are installed inverted, which eliminates trolley poles from main haulage and gathering locomotives, and nips from trackmounted drills, compressors, cutting machines and loaders. Elimination of many physical hazards, time savings and reduced maintenance are advantages of the new system (for full description, see *Coal Age*, October, 1952, p 86).

Mine-car equipment consists of solid-bottom steel cars made by Kana-wha Mfg. Co. These cars, equipped with swivel couplings, have a capacity of  $5\frac{1}{2}$  tons. The rotary dump is designed for this particular-type car. They are held in the dump by angle irons that contact the top of the car body.

J. S. Kern is general mine foreman of Lady Dunn Mine No. 100, and W. T. Hawkes is superintendent of that and the other mines of the company. Their job is to develop the new mine to efficiently produce 5,000 tons of clean coal per day of two-shift operation.

**A 500-ton surge bin keeps the mine operating when the tippie is down— Equipment and methods selected to keep service labor to a minimum— Rapid extraction in panels reduces expensive roof maintenance**



Converted stacker, raised or lowered as necessary to limit degradation, discharges run-of-mine coal from slope belt into . . .

**Starting with adequate surge capacity, West Kentucky's Atkinson is . . .**

## Designed for Future Growth

FEATURING the general layout and methods found to be successful at its other mines, West Kentucky Coal Co. recently opened the new Atkinson mine at Madisonville, Ky., to recover coal from the No. 9 seam with conventional mechanical units and shuttle-

car and belt haulage. Present production is about 2,500 tpd for a working force of 102 men in the mine and tippie, and with four machine-mining units in service. However, the working force includes five unit crews, four on the first shift in room work and

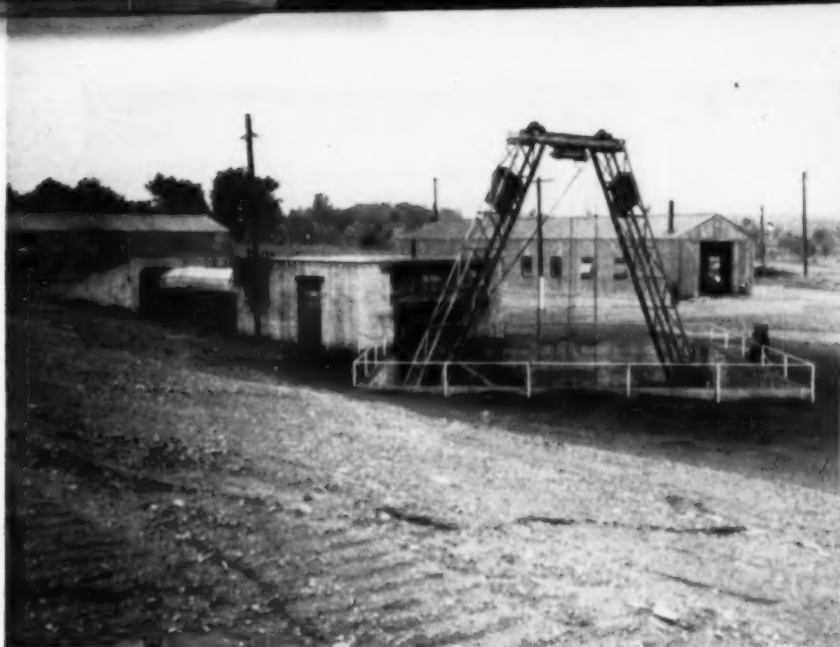
development, and one on the second shift in development.

### PROVIDING SURGE PROTECTION

Among the features of the new mine is a 500-ton surge bin on the surface which cushions underground



**TRACKLESS MINING** and belt-conveyor haulage result in high productivity by promoting faster extraction and lower service-labor requirements at West Kentucky Coal Co.'s new Atkinson mine.



**Concrete 500-ton surge bin, thus permitting underground operations to continue in spite of delays that might occur in the tippie.**

operations against delays in tippie operation. With four units working on the first shift, each producing about 500 tons per shift, the surge bin permits uninterrupted production at the face even though the tippie might be down for as long as one-fourth of the shift.

In discussing the reasons for the big bin, Moss Patterson, chief engineer, points out that the Atkinson installation is a result of experience with smaller bins at other West-Kentucky

mines. Growth in capacity has been steadily upward, from a 100-ton bin at North Diamond, to a 120-ton bin at North Diamond No. 2 and a 260-ton bin at Pleasant View. These three are foot-of-the-slope installations but the new one at Atkinson was too big for underground consideration.

Furthermore, Mr. Patterson says, mining still is a batch operation as far as face operations and haulage are concerned. Whether the unit of production is a single shuttle-car load or

a single fast-loaded cut, it travels through the belt system as a slug of coal. The surge bin receives these slugs and permits them to drain off to the tippie at a steady rate, thus also cushioning the tippie against more or less sporadic outbursts of coal from the mine.

The Atkinson portal is in a worked-out strip opening from which the No. 11 seam was recovered; therefore, the slope penetrates only the rock interval between the two seams. Portal facilities include a combined office and storeroom, a lamphouse and change-room with a covered entrance to the slope manway and the surge bin and tippie.

#### **STOWING ROCK UNDERGROUND**

The main entry consists of four headings from the foot of the slope to the back of the property. However, short gob headings are driven parallel to the main headings between panel entries to provide stowage room for the rock taken at belt transfer points. Seam height persistently averages from 56 to 58 in.

The main headings are 14 ft wide on 36-ft centers. Triple-heading panel entries are driven with similar dimensions on 700-ft centers at right angles to the mains. Rooms are turned both ways from the panel entries at right angles, and are driven 24 ft wide on 39-ft centers to a distance of 300 ft from the outer headings. A 20-ft barrier is left between panels at the ends of the rooms, and a 100-ft barrier along the mains.

As shown in the accompanying map, the South mains at the time of



**SHORT GOB HEADINGS** between panel entries provide stowage room for rock which is taken down for headroom at belt transfer points. West entries now are being developed according to the projections.



**TRACKLESS MINING EQUIPMENT** achieves an output of about 500 tons per unit-shift from 58-in-thick No. 9 seam.



**SERVICE INSTALLATIONS**, like this plastered stopping, provide maintenance-free service and possibilities for re-use.



**ATKINSON TIPPLE**, fed from the 500-ton surge bin, is equipped for sizing, hand-picking, crushing and three-track loading of industrial fuel.

the visit had been driven almost to the property line. The next order of business is the West entry. Then most of the solid reserves will be past the initial development stage.

Contrary to expectations, the new mine is not equipped with brand-new machines. West-Kentucky thought on this matter led to placing new machines in older mines and rebuilding the older units for Atkinson, where closeness of the workings to the portal makes maintenance of these units an easier task.

Mining equipment includes the following Joy units: four 14-BU loading machines, four 10-RU cutting machines, four CD16 coal drills and eight 42E shuttle cars. The transportation system includes 30-in belts in the panel entries, a 36-in belt in the main entry and a 48-in slope belt, all Goodyear belts on Jeffrey conveyors.

#### CONTROLLING SERVICE LABOR

The use of belt haulage and rapid extraction in room panels are two major factors contributing to a low service-labor-to-producer ratio. Rapid extraction eliminates any need for expensive, time-consuming roof maintenance and the belt system requires a minimum of tributary labor. Furthermore, stoppings along the panel entries are made of Koroseal on wood framing with plaster sealing around the edges. In addition to requiring little maintenance, such stoppings may be reclaimed for further use.

Whenever possible, steps are taken to prevent equipment breakdowns to keep maintenance labor under con-

trol. For example, spring-loaded shock absorbers, anchored to the roof at shuttle-car discharge points, protect the trailing cables of the cars from sudden jerks. Such emphasis on controlling service labor results in relatively high productivity over the entire payroll.

On the surface, the slope belt discharges to a 48-in stacker, which is suspended from a trestle bent atop the surge bin. A hoist raises or lowers the end of the stacker as necessary to limit the drop into the bin.

A plate feeder under the bin withdraws the coal and discharges to a double-roll McNally-Pittsburg crusher with the rolls set to produce either 5- or 10-in lump, as the market dictates.

A 36-in tippie feed belt receives the crusher product and discharges at the top of the plant to a triple-deck Allis-Chalmers Ripl-Flo screen. Lump coal is fed to a picking table and then directly to the loading boom. The smaller sizes, usually 2x5-in and 1¼-in slack, also may be directed to their loading booms. However, when greater tonnages of slack are required, the larger sizes may be routed through a crushing circuit, then to loading.

Capping the preparation facilities is a short-coupled Fairbanks-Morse scale with a Streeter-Amet automatic weight recorder for fast, accurate weighing.

The new mine is the latest in West Kentucky's list of up-to-date facilities for providing high-quality fuels. The management team is headed by Hooper Love, president. Moss Patterson is operations manager, as well as chief engineer. F. R. Buckley, preparation engineer; Aubin Higgins, safety director, and Edwin McGaw, mine superintendent, maintain product quality and insure safe, efficient mining. Wallace Barnes is mine foreman.

★ ★ ★ ★ ★

*For every man 85 yr of age, there are seven women. But it's too late then.*



# Announcing...

## **national sales distributors for FIRTHITE "Blue Bit" MINING TOOLS**



### **AUSTIN POWDER COMPANY**

**428 ROCKEFELLER BUILDING**

**CLEVELAND 13, OHIO**

*To serve your mining tool needs even better than before Firth Sterling Inc. has appointed the Austin Powder Company as its national distributor for Firthite Sintered Carbide Mining Tools.*

Now, from the 30 strategically located Austin Powder supply centers, you can get immediate delivery of machine bits, auger drill bits, roof drill bits and finger (strip)

bits in styles and sizes to meet every mechanized mining need.

*Austin* has served the coal producing centers of the country for more than a century! Backed by *Firth Sterling's* design, engineering, and development facilities for better carbide tools, this new manufacturer-distributor alliance will help you to produce "Better, Faster and Cheaper."

High Speed Steels • Tool & Die Steels • Stainless Specialties • High Temperature Alloys  
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COAL AGE • January, 1953



### ***Firth Sterling* INC.**

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

# Foremen's Forum

## What the Moving Finger Wrote

*The Moving Finger writes; and, having writ,  
Moves on: nor all your Piety nor Wit  
Shall lure it back to cancel half a Line,  
Nor all your Tears wash out a Word of it.*

*—Rubaiyat of Omar Khayyam*

THE MONTH OF JANUARY takes its name from a Roman god named Janus. On Roman coins he was depicted as having two faces, one for looking back into the past and the other for peering into the future. Hence, January is a time for contemplating the future and reflecting upon the past.

We have recently spent some time in the 1911-12 era by reading the earliest issues of *Coal Age*, which was a weekly then. It is a revealing record, throwing much light on what the men in the industry were thinking, what they were doing and what their hopes for the future were.

If you can recall those days, come back for a short visit, and we who cannot recall will accompany you to learn something of what it was like.

In those days, some state mine inspectors were elected by popular vote, the liquor traffic in mining camps was a problem of great concern, first-aid training sparked by Dr. M. J. Shields, Jermy, Pa., was in the spotlight, the Bureau of Mines under Joseph A. Holmes was in its infancy, local mining institutes were extremely popular, YMCA night schools were operating and spreading out, labor-management troubles were brewing in many areas, the red record showed about 5 fatalities per million tons, and in Boston the retail price of chestnut anthracite was \$7.50 per ton.

Do you recall when state inspectors in the Pennsylvania anthracite region were elected at the polls by the voters of the inspection district? The law was enacted in 1901 by the legislature in the hope that inspectors would not be subject to undue pressures in the discharge of their duties. The great objection, which became evident soon after the enactment of the law, was embodied in the amount of time and effort the inspector was forced to devote to electioneering. In 1911, advocates for repeal of the law were growing in number.

Also, in 1911 *Coal Age* included a regular feature called the Sociological Department which was written "for the betterment of living conditions in mining communities." Among the articles appearing in this department at the time were descriptions of miners' houses in Scotland to help American operators prepare accommodations for immigrating miners, plans for the construction and fitting of rescue and emergency railroad cars like that of the Colorado Fuel & Iron Co., a discussion of the problems attending the arrival of large numbers of miners from southern Europe, a treatise on the efficacy of marriage in controlling boisterous bachelors in mining camps, and a review of the evil effects of intoxicating beverages in these camps.

In retrospect, the 1911 interest in these problems may seem frivolous, but at that time they were real and large. Sometimes unusual steps were taken to solve them.

For example, take the Greenwald Wel-

fare Plan which was in force at Greenwald, Pa., at the time. An article in *Coal Age*, Dec. 2, 1911, reads in part as follows:

"Families using the least liquor were given the best houses. Those whose beer record was not down to the minimum were given second-class houses, and the families that ordered the full amount of liquor allowed were given the 'shacks.'"

"The full allowance (except under special conditions) was five kegs per week to a family (including the boarders) if living in a shack, three kegs if living in a second-class house and two kegs if living in a first-class house."

"The rent was the same for all houses. Families with a low beer record could secure from the company sod for their yards, lumber with which to construct sidewalks, fruit trees, flower seeds and things necessary in preparing and making gardens."

The annual banquet of the Scranton (Pa.) Mining Institute was held Oct. 21, 1911. There were 1,600 members in attendance. Other institutes were enjoying an equal measure of success, with membership lists including all who wished to join, from nipper to superintendent. And we like to think *Coal Age* was of some help in organizing the Rocky Mountain Coal Mining Institute.

The issue of Aug. 24, 1912, carries an item addressed to the attention of western coal men, inviting them to make known via the pages of this paper their

## Without Safety

Without safety—accidents begin

When accidents begin—suffering starts

When suffering starts—sympathy is offered

When sympathy is offered—wages are absent

When wages are absent—compensation is received

When compensation is received—debts pile up

When debts pile up—worry is present

When worry is present—recovery is slow

When recovery is slow—days are twice as long

When days are twice as long—there is plenty of time to think

With plenty of time to think—the accident is recalled

When the accident is recalled—you realize it started

**"WITHOUT SAFETY."**

—Andrew J. Sleboda, Wharton No. 2 mine,  
Coal Div., EG&FA; Reprinted from EG&FA Safety News Letter

# B.F. Goodrich



## How coal hauler gets 3,500 hours' service from Universal tires

**T**HE Central Pennsylvania Quarry, Stripping and Construction Company strips anthracite and bituminous coal in Pennsylvania and West Virginia, constructs highways, airports and dams in Pennsylvania, Delaware and New York. Seventy trucks operated by this Hazleton, Pa., firm carry coal and excavation material over rocky mine and construction roads.

The truck pictured above, for example, will be loaded with as much as 30 tons of coal before starting up the steep grade to the dumping platform. Tires take a terrific beating on hauls such as this. Tire costs skyrocket.

Not so with the tires shown. They are B. F. Goodrich tires designed to withstand the strain of rugged coal stripping operations. This company reports its BFG tires with Universal

tread run as many as 3,500 hours of tire-killing service; then can be recapped, good for another 2,000 to 2,500 hours.

One factor in this amazing record is the specially-compounded Universal tread that resists cuts and snags. Husky, wedge-shaped cleats give positive two-way traction, "pull up grades with heavy loads in all kinds of weather," says purchasing agent Harold Stegner.

The nylon shock shield, exclusive B. F. Goodrich development, protects the tire body from shocks and bruises. Strong, elastic nylon cords under the tread rubber stretch together under impact, give you this 4-way saving: (1) more recappable tires and more miles per recap (2) greater average mileage (3) increased bruise resistance (4) less danger of tread separation.

All these savings, yet the nylon shock shield costs nothing extra. It's built into all BFG off-the-road tires of 8 or more plies. *Double* nylon shock shield in larger sizes.

See the complete line of money-saving B. F. Goodrich tires at your BFG retailer's store. You'll find the address under Tires in the Yellow Pages of your telephone book. *The B.F. Goodrich Company, Akron, Ohio.*



interest in a mining institute to serve Colorado, Utah, Wyoming, New Mexico and Montana. The article was the outcome of a letter to the editor, Floyd W. Parsons, from W. F. Murray, mine superintendent, Victor-American Fuel Co., Delagua, Colo. Mr. Murray wrote, "It is to be greatly regretted that we have not in the West a society of men engaged in coal mining. . . . If we had such a society, it could not fail to benefit thousands of men. . . . If someone would only give the ball a little push, we would all endeavor to keep it rolling."

Reaction to the suggestion must have been instantaneous, for the issue of Nov. 30, 1912, presented the names of the charter members of the Rocky Mountain Coal Mining Institute. Among them were Messrs. Parsons and Murray, and western coal men including C. A. Allen, Herbert Addison, Alexander Bowie, D. A. Cannon, James Dalrymple, Otto Herres Jr., D. Harrington, Benedict Shubart, B. W. Snodgrass, F. W. Whiteside, T. C. Harvey, J. B. Morrow, D. H. Somerville, A. L. Bailey, A. H. Cowie, H. E. Lewis, H. C. Marchant, W. N. Wetzel, H. G. Williams, W. F. Harris, F. L. McArty, George B. Pryde, P. J. Quealy, and E. F. Woodson. All told, there were 237 charter members, according to this published list. Thus the RMCMI was launched.

Having mentioned Mr. Parsons, we may be recalling to your memory the other members of the original editorial staff. They were J. T. Beard, R. Dawson Hall, A. T. Shurick and F. H. Kneeland. Mr. Hall served continuously until his retirement Dec. 31, 1946.

Indicative of the times was the large number of men who devoted many of their evenings to diligent study to prepare themselves for better jobs in the industry. I wonder how many of us in 1953 can take pencil and paper in hand and extract the fifth root of a number with a reasonable degree of accuracy.

Well, the issue of Sept. 7, 1912, tells you how, as follows:

"Let it be required to extract the fifth root of 23,415. Find the fifth power of a number taken for trial; thus, taking 8,  $8 \times 8 \times 8 \times 8 \times 8 = 32,768$ . This number being greater than the given number, try 7; thus,  $7 \times 7 \times 7 \times 7 \times 7 = 16,807$ . This number being less than the given number, the required fifth root lies between the two numbers taken.

"Now to find the fifth root to the first decimal place, proceed as follows:  $8 \times 8 \times 8 \times 8 \times 7 = 28,672$ . This number being greater than the given number, try again, thus,  $8 \times 8 \times 8 \times 7 \times 7 = 25,088$ , which is still greater than the given number. Therefore, try again,  $8 \times 8 \times 7 \times 7 \times 7 = 21,952$ , which is less than the given number. The fifth root of the given number to one decimal place is, therefore,  $(8 + 8 \div 7 + 7 \div 7) \div 5 = 7.4$ .

"To find, further, the fifth root to two decimal places, divide the given number by the fourth power of the root already found; thus,  $23,415 \div 7.4^4 = 7.8$ . Add this result to four times the root to the first decimal place and divide by 5; thus,  $[(4 \times 7.4) + 7.8] \div 5 = 7.48$ . Therefore, the fifth root of 23,415 is 7.48."

In direct contrast to such heaviness, there was the gossamer lightness of whimsical poetry. In April, 1912, we reprinted from *Fuel* this one entitled "The Pit Boss," by William Harkes:

*The pit boss stood at the Pearly Gate  
His face looked worn and old,  
He meekly asked the man of fate  
For admission to the fold.*

"What have you done," asked Peter kind,  
To seek admission here?"  
"Oh, I used to boss a coal mine  
On earth for twenty year."

*The gate swung open sharp  
As Peter touched the bell.  
"Come in, my lad, and take your harp  
You've had enough of Hell."*

The interesting record goes on and on. The western winter of 1911-12 was severe, and a report from the Salt Lake City correspondent says, "There are just about 10 orders for each car of coal mined by the Utah mines, and as the coal season does not really start until Dec. 1, the indications are that this pro-

## Chit Chats . . .

Trainer: "Well, old-timer, I'm afraid you're licked now."

Boxer (dizzily): "Yep; I guess I should've got him in the first round when he was alone."

★ ★ ★

She: "If wishes came true, what would you wish for right now?"

Soldier: "Gosh, I'm afraid to tell you."

She: "Go ahead! Why do you think I brought up this wishing business?"

★ ★ ★

Passing a run-down store in a distant city, a well-known artist noticed a mangy little kitten lapping up milk from a saucer. The saucer, he realized with a start, was a rare and precious piece of pottery.

He sauntered into the store and offered two dollars for the cat. "It's not for sale," said the proprietor.

"Look," said the collector, "that cat is dirty and undesirable, but I'm eccentric. I like cats that way. I'll raise my offer to five dollars."

"It's a deal," said the proprietor as he pocketed the five-spot.

"For that sum I'm sure you won't mind throwing in the saucer," said the connoisseur. "The kitten seems so happy drinking from it."

"Nothing doing," said the proprietor firmly. "That's my lucky saucer. From that saucer, so far this week, I've sold 34 cats."

—The Yellow Strand

portion is liable to increase rather than diminish." John P. White was president of the United Mine Workers, and William Green, national statistician of the union, was a candidate for the office of secretary-treasurer. John Mitchell was voted out of the union. President Taft spoke to a session of the American Mining Congress and attended a national first-aid meet at Forbes Field, Pittsburgh, Pa.

When an excuse for poor performance was needed, the most stubborn mule in the mine was tabbed as the bottleneck, as often as not. The day-to-day problems of mining and mining methods of the times were thoroughly discussed in articles contributed by Eli T. Conner and others.

There was no shortage of grim articles either. Almost every issue had a story about a mine fire or explosion and the ensuing rescue work. The issue of November 18, 1911, tells of the disaster at Adrian mine where eight men died. A Bureau of Mines rescue car was taken to the scene with a crew of four men under J. T. Ryan, engineer in charge. The article continues with an account of how Mr. Ryan—later to become co-founder of the Mine Safety Appliances Co. with George H. Deike—and his men entered the mine with canaries as gas detectors to re-establish the ventilation and search for the bodies of the victims.

The big issue in labor-management donnybrooks was the check-off system for payment of union dues. Opinions on the matter were either black or white, there were no shades of gray.

With a bow to the Ouija Board, an editorial in the issue of April 6, 1912, said: "The coal industry has only just begun. Before the century is over we may extract gas from the fuel deposits without mining, or we may consume the coal as an electrical anode in a giant battery cell."

In our time, both the check-off and underground gasification are accepted facts.


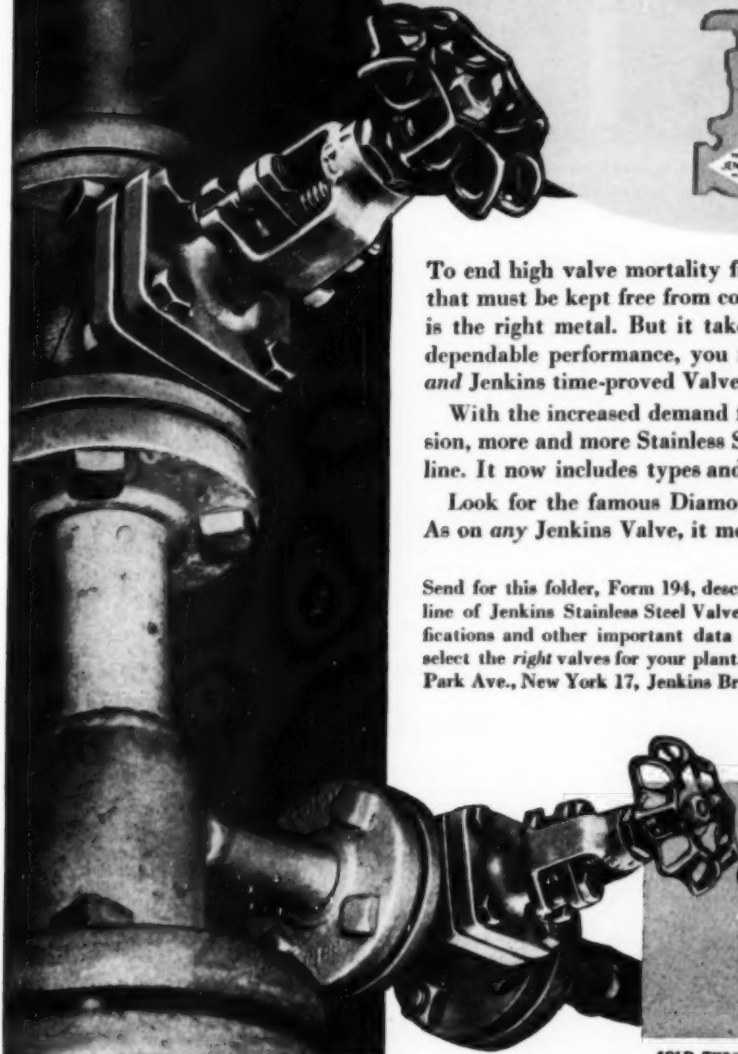
In 1911 and 1912, the men in the industry were living their lives with perhaps no thought that 40 yr later their actions and thoughts would be probed like this. They solved their problems as they recognized them and with the methods and knowledge at hand, even as we do now.

I wonder if our actions will be similarly probed 40 yr from now. In 1993 will the coal industry be producing at an annual rate of 2½ billion tons, as has been recently prophesied? And if we are producing 2½ billion tons, will we have the capacity to produce 3½ billion tons, thus assuring that some of our present problems still will be with us?

We can at least take credit for facing up to these future problems, as indicated in the article entitled, "Coal Stabilization," in the December, 1952, issue of *Coal Age*. In any event, let's hope that in the next 40 yr we can add as many striking elements to the industry's mosaic as have been added in the last 40 yr. It will demand only the vision to see opportunity and the nerve to exploit it. And all the while, the Moving Finger writes.



Here's the hookup  
for valve-killing  
corrosive services...



# Stainless Steel

PLUS

# Jenkins Quality

To end high valve mortality from corrosive liquids, and to control fluids that must be kept free from contamination or discoloration, stainless steel is the right metal. But it takes more than metal to make a valve. For dependable performance, you need the two-way hookup—Stainless Steel and Jenkins time-proved Valve Engineering.

With the increased demand for processing equipment that resists corrosion, more and more Stainless Steel Valves have been added to the Jenkins line. It now includes types and sizes to meet most industrial needs.

Look for the famous Diamond trade-mark on valves of stainless steel. As on any Jenkins Valve, it means extra years of trouble-free service.

Send for this folder, Form 194, describing the complete line of Jenkins Stainless Steel Valves. It contains specifications and other important data that will help you select the *right* valves for your plant. Jenkins Bros., 100 Park Ave., New York 17, Jenkins Bros., Ltd., Montreal.



## JENKINS VALVES

LOOK FOR THE DIAMOND MARK



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SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE

# Operating Ideas



**SPEEDING SCREEN CHANGES**—The angle spout is hung on stationary hook and the chain block is moved back into position to pick up the drier cover. Electric impact wrench (right) makes quick work of removing bolts.

## Proper Tools Cut Screen Changing Time to One-Sixth

**SPECIAL EQUIPMENT** for the job cuts the time for drier-screen changes from 2 hr and 45 min to 25 min in the new preparation plant at Lady Dunn Mine No. 100 of the Cannelton Coal & Coke Co., Cannelton, W. Va. The driers are CMI Model E36. In this Lady Dunn plant the carbon-steel screens used on the drier baskets are renewed after 6 days of 2-shift operation. An extra basket is kept made up with new screen ready for change.

When making the first screen renewals

after putting the plant into operation it was found that the time-consuming jobs were turning the bolts and nuts with hand wrenches, running the chain block clear down to rest the coal-feed spout on the floor and then running it back to practically full height to handle the machine cover.

Purchase of a Black & Decker electric impact wrench with  $\frac{1}{2}$ -in drive solved the bolt-and-nut difficulty.

Spout-handling time was cut by welding a hook onto the spout near the bal-

ance point and then installing a permanent hook suspended by wire rope from the ceiling structure at the end of the trolley I-beam. Now, after a spout is hoisted from the top of the drier, the supporting trolley is pulled to the end of the I-beam and the spout lowered just enough to leave it suspended on the wire-rope hook. That stores it out of the way and leaves the hoist hook at approximate proper height to lift the machine cover. (For a detailed description of this plant, see p 108 of this issue.)



## Heavy Duty Rail Dog Designed for Severe Grades

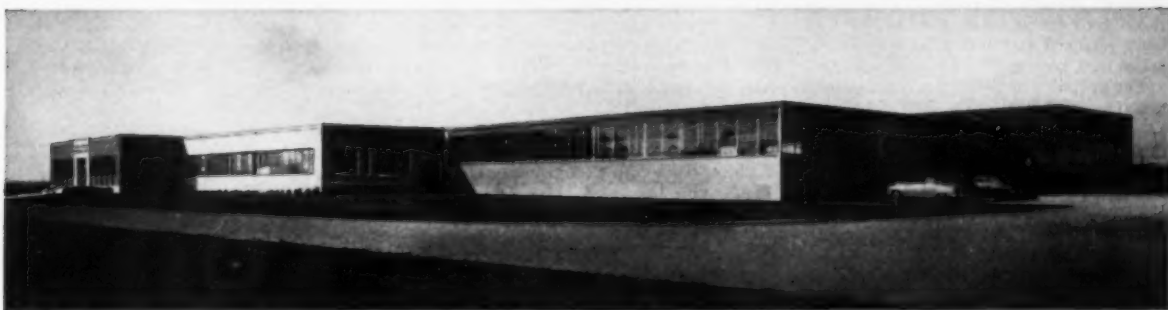
**SEVERE GRADES**, ranging from 3 to 14%, prompted officials at Statesbury No. 8 mine, Eastern Gas & Fuel Associates, Statesbury, W. Va., to design a special heavy duty rail dog to prevent runaways of loaded trips. Large mine cars, clearing the rail by 3 in and operating on 85-lb welded track, were difficult to hold with ordinary methods.

Armor plate, 1x4-in steel and a standard 1 $\frac{3}{4}$ -in coupling pin were used to build new stops. Two steel flanges, welded to the L-shaped armor-plate center piece which rests on the rail, keep the dog from twisting sidewise or falling off the rail. A standard 1 $\frac{3}{4}$ -in coupling pin inserted through the side straps at a point below the rail base secures the car stop to the rail.

The device has proved its strength by breaking out a 3-ft section of 85-lb rail when it received the momentum of a heavy moving trip.

# GOULD OPENS 21<sup>ST</sup> PLANT

## TO MEET INDUSTRIAL BATTERY DEMAND



Front and side views of Gould's new Kankakee, Ill., plant

**GOULD'S NEW KANKAKEE PLANT** which went into production on November 10 is the 21st Gould plant in the United States and Canada. Devoted entirely to the manufacture of storage batteries for industry, it gives Gould the additional capacity necessary to meet the increased demand for Gould batteries in all parts of the country. Thanks to these new facilities, Gould customers can expect even faster service than before.

# GOULD

*Industrial Batteries*  
GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

*Always Use Gould-National Automobile and Truck Batteries*



## Salvaged Electrical Unit Signals Fan Slowdown

A DISCARDED PIECE of electrical equipment furnished Paul Stewart, maintenance superintendent, Compass Coal Co., Philippi, W. Va., with the basic parts for a fan signal at the Compass No. 1 deep mine.

A hoisting plugging switch, originally used on the Bradford breaker in the tippie to indicate slip in an overloaded centrifugal clutch, was discarded when the clutch was replaced by a heavy-duty coupling. A small fan attached to the salvaged unit is bracket-mounted to the fan housing where it is exposed to the force of the exhausting mine air. When the fan runs normally the mechanism will not operate the signal in the substation. However, when the fan stops or the fan speed becomes less than normal a circuit is closed and a signal is sounded in the substation. When fan performance returns to normal the buzzer in the substation discontinues sounding.

This signal has worked perfectly since installation, declares Mr. Stewart.

## For Your Information—Rules Regulating Splices in Trailing Cables

ARE YOU UP TO DATE on Pennsylvania's rules governing splices in coal-mine trailing cables? Here's a review:

**Rule 57**—"In the event of the trailing cable in service breaking down or becoming damaged in any way, or of its inflicting a shock upon any person, it shall be at once put out of service. The faulty cable shall not again be used until it has been repaired and tested by a properly authorized person."

For purposes of definition, a temporary splice in a trailing cable shall mean any splice where the conductors have been fastened together by splicing rings or other means and insulated with rubber and friction tapes; a permanent splice shall be one that is made mechanically, electrically and dielectrically equivalent to the original cable, and where the insulating and sheath materials have been properly bonded and cured.

Here are some interpretations of Rule 57 as formulated by the Pennsylvania Department of Mines:

When any multiple-conductor trailing cable has five temporary splices it shall be put out of service, respliced in an approved manner, revulcanized and tested before it is again put in service. If the fifth temporary splice was put in the cable after the machine had been placed in operation for the shift, the machine operator may continue for the balance of the shift.

Where trailing cables are wound on a reel, the vulcanized section of the cable shall not have an over-all diameter larger than the original cable. This rule applies to shuttle cars and mobile cutting machines where the cable is wound on a reel and the machines are moved into other or adjoining places.

Hand cables shall be put out of service

at the end of the shift if they have more than one temporary splice. If the hand cable is taken out of service and revulcanized, the over-all diameter should not be larger than the diameter of the original cable. The hand cable is the cable between the reel and the mining machine which has to be handled by the machine operator as the machine advances across the working places, or if no reel is being used, the hand cable shall be construed to mean at least 50 ft of cable next to the machine.

A concentric trailing cable shall be put out of service if it has more than five temporary splices. If it has five temporary splices, it shall be removed from the machine at the end of the shift and shall not be put into service again until the splices have been repaired and the cable revulcanized and tested.

The machine operator shall frequently examine the trailing cable, and if he finds any cuts or bruises all such cuts or bruises shall be properly insulated until the cable is put out of service, at which time the cable shall be revulcanized as specified and retested.



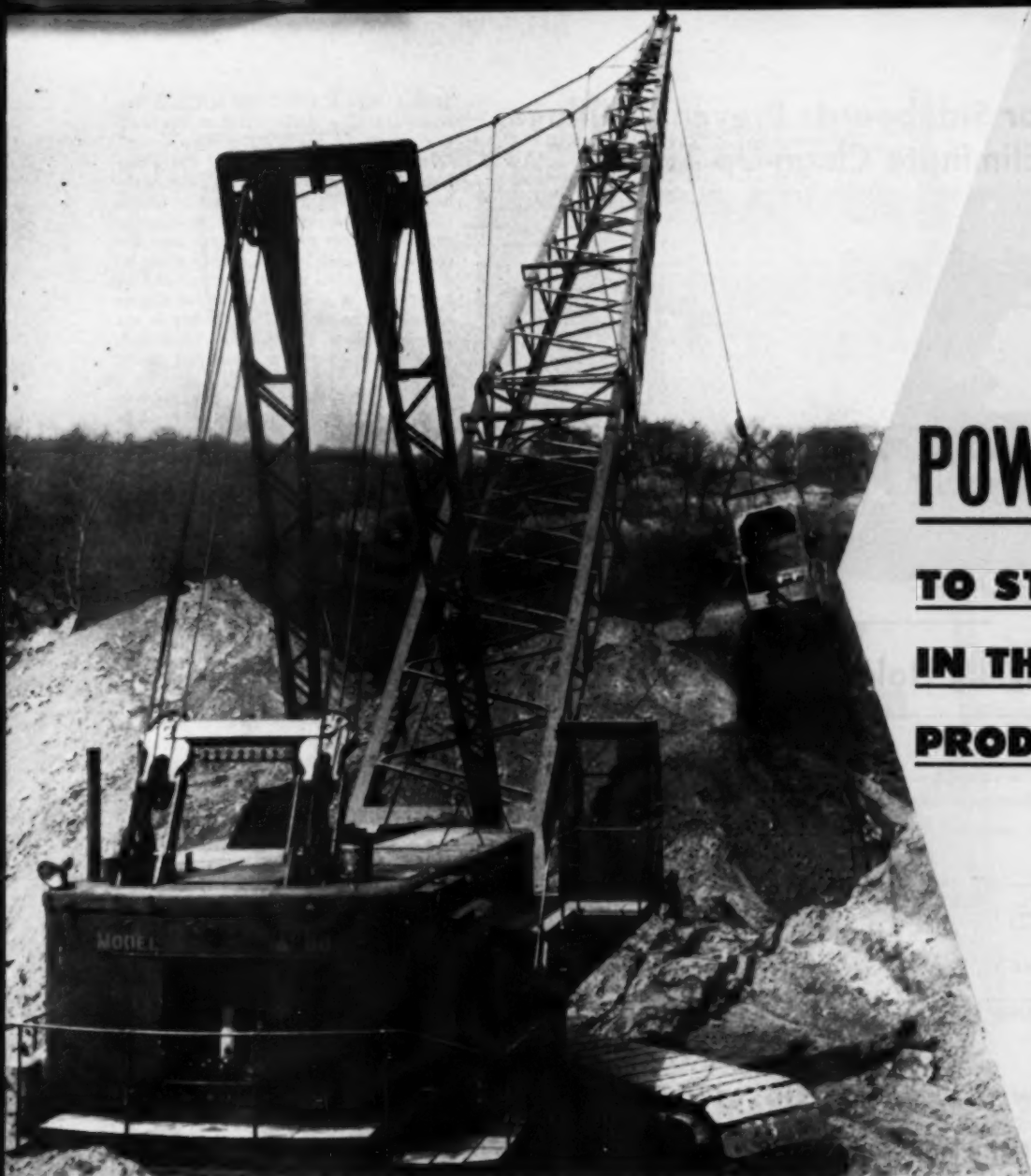
## Wick Oilers Preferred For Low-Speed Bearings

R. W. NESTOR, preparation superintendent, Lady Dunn Mine No. 100, Cannelton Coal & Coke Co., Cannelton, W. Va., notes that lubrication of the new preparation plant was improved, greasing labor reduced and the cost of lubricants cut by substituting wick oilers for compression grease cups.

In these oilers, made by Gits Brothers Mfg. Co., Chicago, a wick extending from the bottom of the reservoir to the top of a center tube, and then down through the hole to the shaft, feeds oil gradually. Seepage of oil from ends of the bearings carries out dirt and dust. One and one-half gallons of oil per day lubricates all of the low-speed bearings of the 450-tph plant.

**POINTING FINGER** indicates center tube with wick bent down into the oil.





**POWERED**  
**TO STAY**  
**IN THERE**  
**PRODUCING!**

WHEN its owners ordered this 5-cu.-yd Manitowoc Speed Crane with 120-ft. boom, they specified Caterpillar power. Why? Here's the answer, straight from W. J. Futch of Joseph Futch & Sons, Pittston, Pa. "Long life and wearability are the main reasons we specify Caterpillar Diesel Engines. We use them exclusively in all our equipment. The D386 handles this dragline in rough going with power to spare."

**CATERPILLAR**

REG. U. S. PAT. OFF.

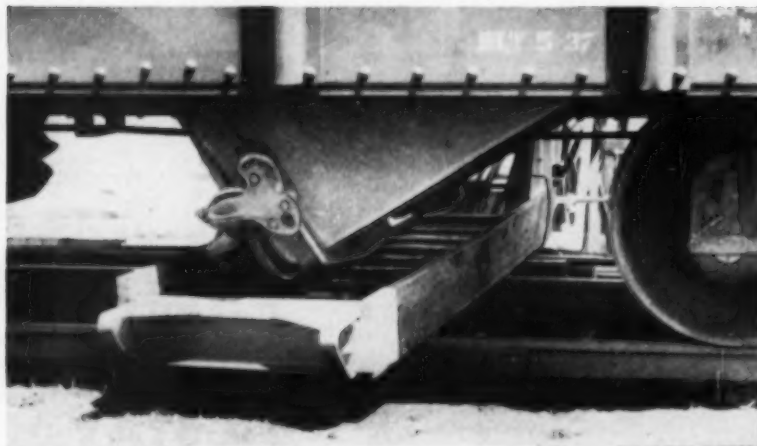
**DIESEL ENGINES  
TRACTORS • MOTOR GRADERS  
EARTHMOVING EQUIPMENT**

Stripping overburden near Wyoming, Pa., this rig works 18 hours a day, 25 days a month, 12 months a year. Cost of operation is mighty reasonable—you don't have to feed a Cat Diesel expensive premium fuels. It uses low-cost No. 2 furnace oil without fouling. And it stays in there working, day in and day out with a minimum of down-time. If it ever needs attention, you can rely on your Caterpillar Dealer for fast, genuine parts service—on the spot.

All these and many other advantages are sound reasons for specifying Caterpillar power the next time you order. Leading manufacturers can supply Cat Diesels in the machines they build. Engines are available up to 500 HP—electric sets, up to 315 KW. Ask your nearby Caterpillar Dealer for complete facts and a demonstration!

CATERPILLAR, PEORIA, ILLINOIS

## Conveyor Sideboards Prevent Spillage, Eliminate Clean-Up Time

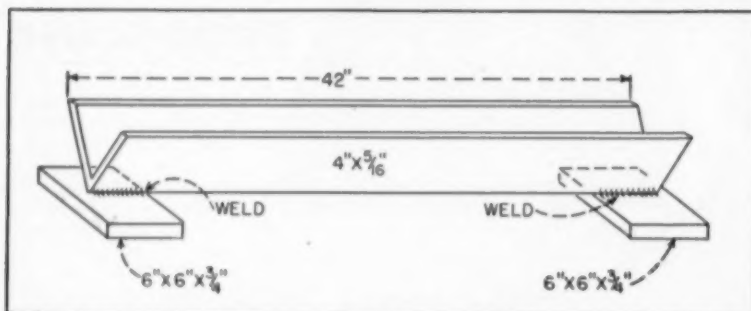


THE SOURCE OF THIS IDEA is the coal yard of a dealer, Dalton Fuels of Gary, Ind. As described in *The Consol Dealer*, dealer publication of the Pittsburgh Consolidation Coal Co., the 2x10-in sideboards on the track section of the unloading conveyor prevent spillage as coal flows from the car hopper onto the conveyor. The 2x10's are held in place by 2-in angle pieces at the near end and by loops made of steel rod at the far end, as shown in the photo. The sideboards are slid into place, through the loops first, after the conveyor is positioned under the car.

The big benefits come from savings in labor costs when clean-up time is eliminated.

Perhaps you have an unloading problem that could be solved by such a conveyor equipped with sideboards to prevent spillage. It might be used to unload sand, either at cleaning plants or at the mine, to unload railroad-shipped raw coal to plant feed conveyors and in similar applications.

## Welding Jig Holds 4-In Pipes for Making Longer Jackpipes



**SIMPLE TROUGH** sets on welder's bench to hold short pipes for joining.

**DON'T THROW AWAY** short pieces of 4-in pipe any longer. Take the advice of Earl K. Baber, New River mine, Summerlee, W. Va., and make a trough to hold those short sections for welding. Then you can use the longer pieces that result as jackpipes for holding down shaking conveyor drive units.

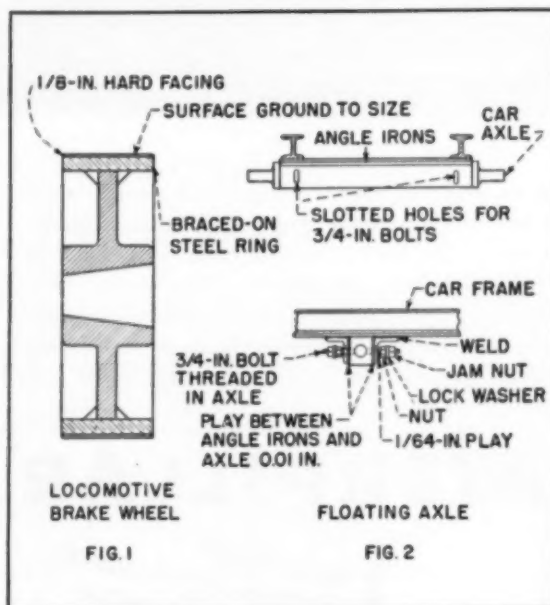
The trough is made of two pieces of steel plate, 42 in long 4 in wide and 5/16 in thick, which are welded together to form a V, as shown. Two 6x6x3/4-in plates are welded to the ends to form a stable base for the trough. You merely lay the short pieces in the trough and sew them together with your torch and rod.

## For Lower Haulage Costs—Try These Ideas

THESE TWO cost-cutting ideas for rail haulage developed by Phil Keast, master mechanic, Empire Star Mines, Ltd., Grass Valley, Calif., appeared in a recent issue of *Engineering and Mining Journal*.

1. Originally, cast-iron brake wheels on electric locomotives at the mine lasted less than 1 mo. To remedy this difficulty, the worn rim was turned off in a lathe and a hard-faced steel ring braced in its place, and ground to size. The layer of hard-facing is 1/8 in thick. The wheels thus modified as shown in Fig. 1 have been in operation more than 6 mo and show little wear.

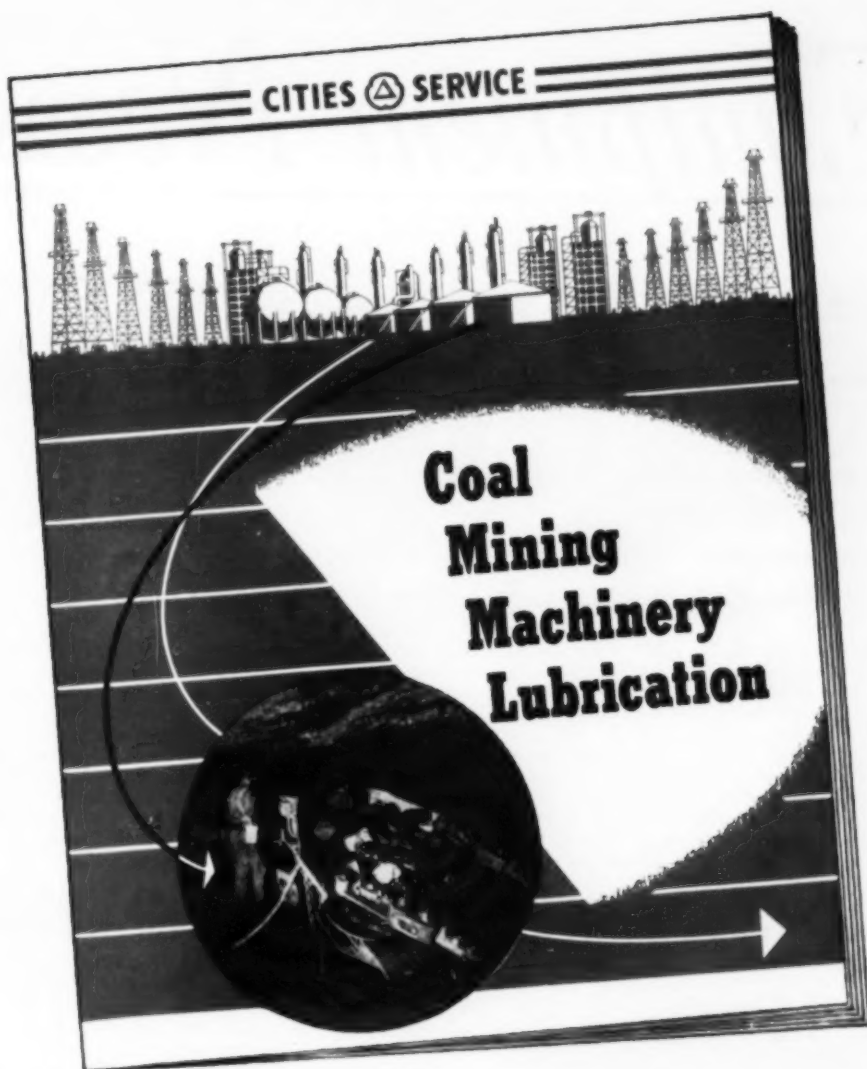
2. To prevent mine cars with rigidly held axles from leaving the track, a floating-axle arrangement was designed and built. Two angle irons with slotted holes were welded to the car frame and shallow-threaded holes were drilled in axles to accommodate 3/4-in bolts fitted with nut, lock washer and jam nuts as shown in Fig. 2. The space between the angle irons is about 0.010 in wider than the axle, and bolts are set with 1/64-in clearance between the wall of the angle iron and the nut. The arrangement permits the axle to float, preventing the wheels from leaving the track.



**LOCOMOTIVE  
BRAKE WHEEL**

**FIG. 1**

**FIG. 2**



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**TODAY, MORE THAN EVER BEFORE, THIS LUBRICATION BOOK CAN PROVE EXTREMELY USEFUL IN EVERY MINING OPERATION**

This new Cities Service Lubrication Book offers lubrication recommendations for every type of mining machinery . . . everything from drills, cutters and loaders to wire rope and ventilating fans.

It includes a complete lubrication chart for all mining machinery. Invaluable! . . . especially when training new personnel.

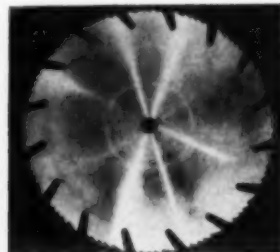
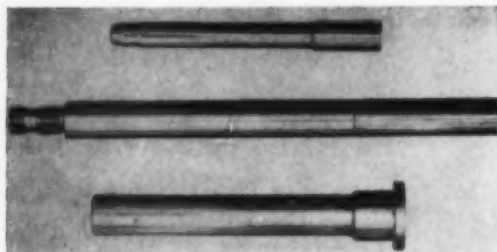
Head man or beginner in *any* mining operation . . . you'll want this book not only for vital, specific lubricating recommendations and procedures, but also for the general information contained on the make-up and function of the complete line of high quality Cities Service oils and greases. **FOR YOUR FREE COPY**, write Cities Service Oil Company, Dept. A-9, Sixty Wall Tower, New York City 5.



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COAL AGE • January, 1953

# Equipment News



**MORE SERVICE from core rods . . . check-valve balls . . . and saw blades results as**

## **New Process Plates Numerous Metals With Tungsten Carbide (1)**

"Flame-Plating," a new method for applying hard, thin, precise coatings of powdered metals, such as tungsten carbide, on a wide range of metal parts, is now being used to help solve varied problems of frictional and abrasive wear, according to the Linde Air Products Co., developers of the process. The method is adaptable to many different base metals, including steel, aluminum, copper, brass and bronze, and several coating materials

have been used. Tests to date indicate that Flame-Plated tungsten-carbide coatings have wear and abrasion resistance as good or better as sintered tungsten carbide, offering the desirable properties while avoiding some limitations of the sintered form. Since during the process the base metal does not exceed 400 F, the base metal retains all its properties, the company says. There is no mixing of the coating with the base metal and the

parts can be ground or lapped to the proper finish after coating. Plating aluminum or magnesium produces a lightweight part with high wear resistance, it is said. Plating now is done in the company's Speedway Laboratories in Indianapolis, but additional facilities are expected to be provided. Circle No. 1 on the postage-free card for full details from the Linde Air Products Co., Div. of UC&C, New York 17.



## **Vibrator Designed for Heavier Loads (2)**

New-style Model MS Robins Vibrex vibrating screen for the sizing and processing of coal and other bulk materials will handle heavier loads than previous models, the maker says. It is equipped with a heavier yoke and, instead of leaf springs formerly used, is mounted on coil springs encased in a neoprene-rubber accordion-type boot to keep out foreign material. Both single- and double-deck models, all with 3-in discharge lips, are available, and the single-deck unit is designed for easy conversion to 2-deck operation. The screen uses the circle-throw principle, originated by Hewitt-Robins, which provides two positive strokes for every revolution of the counterweights. Complete data from Hewitt-Robins, Inc., Stamford, Conn.

***It's easy to get bulletins describing items in this section. Just use the postage-free card facing p 132.***



## **WIDE CUTTING FACE FOR NEW BIT (3)**

The Bowditch Co., Canton, Ohio, has announced a new double-ended throwaway-type bit after thorough mine testing. Called the "1-29," the patented shape presents a wider cutting face, whose surface is maintained because of the unusual concave design of the bit body, the maker says. A special alloy steel is used, and each bit is heat-treated in the company's enlarged heat-treating facilities to hardnesses best suiting the customers' requirements.

## **YELLOW PLASTIC PIPE FOR MORE VISIBILITY (4)**

A new yellow plastic pipe which can be easily seen and quickly identified is now being marketed by the Plastex Pipe & Extrusion Co., Columbus, Ohio. Especially compounded for maximum visibility and durability, the color goes all the way through the plastic material and will not fade or stain under any conditions, the maker says. For mining operations, Plastex Yellow pipe has definite advantages, reducing the danger of being damaged by other equipment and permitting





## Most shock- and wear-resistant bits in the mining industry

Your mine can profit from the cutting and drilling efficiency of Kennametal Bits. Tough Kennametal tips stay sharp longer, take harder knocks than any other tungsten-carbide in the industry. Heat-treated, high-quality steel shanks give the Kennametal tips full support in severest cutting and drilling conditions.

Cutting and drilling is faster, there are fewer bit changes, power is saved, and machinery operates under less strain, be-

cause Kennametal Bits keep their hard cutting edges longer. Savings are made in parts replacement costs, power output, and maintenance expense.

Your Kennametal Representative is a man with years of actual mining experience. He'll be glad to suggest and demonstrate the right Kennametal Bit for your cutting or drilling operations. Get in touch with him today!

**World's Largest Manufacturer of Tungsten-Carbide**  
**Drill Bits, Cutter Bits, Roof Bits, Rock Bits, Strip Bits**

# KENNAMETAL®

KENNAMETAL INC., MINING TOOL DIVISION  
BEDFORD, PA.

General Offices and Main Plant at Latrobe, Pa.

It to be positively traced and identified when used with other pipe lines or cables. It offers the lightweight, flexibility and guaranteed service against rust, rot and corrosion found in other types of Plastex pipe.



#### NEW-TYPE SAFETY HAT (5)

New "Saf-Hed-Hat" now being manufactured by the United States Safety Service Co., Kansas City, Mo., is said by the maker to fill a need for a sturdier safety hat with longer life that is still light in weight and comfortable to wear. It is made of fiber glass, a highly resilient material that will not split, crack or deform. The cradle of the hat can be quickly and easily adjusted to fit all head sizes and complies with Federal specifications. Because of the durability of fiber-glass material, this new safety hat will wear twice as long and cut costs in half, the manufacturer states.



#### SAFETY SWITCHES ARE DUST-RESISTANT (6)

A new 200-amp 600-v fusible and no-fuse front-operated HCI safety switch has been announced by the Trumbull Electric Dept., General Electric Co., Plainville, Conn., as an addition to its line of 30-, 60- and 100-amp units. Now standard equipment on all HCI switches, the company also reports, is a felt gasket which blocks dust and dirt and includes other design features to make it truly dust-resistant. Unlike other switches, it is virtually free from direct openings to the interior, the maker says. The Trumbull HCI (high-capacity-interrupter) switch also features ability to interrupt heavy loads quickly and cleanly, it is said.

#### MULTI-PURPOSE GREASE (7)

Among the basic characteristics of Shell Alvania grease, a lithium-base product, combining to make true multipurpose application possible are its high water

tolerance, high resistance to breakdown, broad temperature range, low rate of oxidation and long induction period, and excellent storage stability, the maker says. Savings possible by combining these in one type of grease are reduced grease consumption, elimination of misapplication, reduced inventory, more simplified purchasing and storage; reduced downtime, application cost and maintenance; and substantially increased bearing life, it is pointed out. Details from Shell Oil Co., New York 20.



#### SHOE WITH CONCEALED TOECAP WEARS 50% LONGER (8)

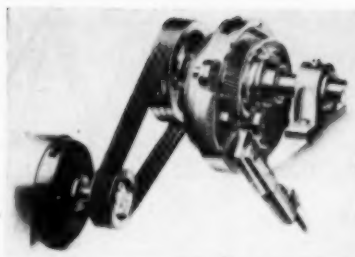
The new "Plus-Fifty" line of safety shoes made by Protective Footwear, Ltd., Bristol, Eng., and now available in this country, combines a high degree of safety with comfortable durability that provides up to 50% longer life than the usual type, the maker says. The standard steel toecap is built into the shoe structure with leather composition blocking above and below, and by its complete concealment gives the boots and shoes the look of normal footwear but with full protection. Dual tannage of the sole leather combines abnormally long wear with high flexibility, with twice the resistance to oil and four-fold resistance to water of the usual vegetable-tanned leather, the maker says. More information from Industrial Supply Co., Box 766, Chattanooga, Tenn.; in Canada, from P. J. O'Donnell, Box 244, New Waterford, N. S.

#### NEW COAL FREEZEPROOFER (9)

New easy-to-use freezeproofing agent called "Formula 5" is an inexpensive combination of granulated sodium chloride, a special corrosion inhibitor, and a free-flowing agent, is between 30 to 70 mesh, and comes in 100-lb 5-ply tough paper bags, the maker says. Formula 5's outstanding quality, besides being easy to handle, is its economical job of freezeproofing when applied in its natural dry form, it is stated. Full details from the Morton Salt Co., Chicago 3.

#### SHAFT-MOUNTED REDUCERS (10)

"Shaft-King," a new series of 20:1 ratio speed-reduction units featuring important improvements in gears, bearings, housing, lubrication and oil-sealing systems, has been announced by the American Pulley Co., Philadelphia 29. Gearing in the units consists of two trains of the single-helical type, precision-cut from alloy steel forgings and flame-hardened. Interchangeable patented split tapered bushings with locking nuts eliminate fretting corrosion and make the units immediately adaptable to any shaft size up



through 3 $\frac{1}{2}$  in for easy mounting directly on shaft of driven machine, the maker says. "Shaft-King" drives are illustrated and described in a new 20-p catalog available upon request.

#### SCREEN CLOTH HEATED BY NEW METHOD (11)

A new method of heating screen cloth by electricity to prevent clogging or blinding when wet materials are screened has been announced by Hewitt-Robins, Inc., Stamford, Conn. Current is carried to the screen by short insulated cables attached to copper bars located under the screen cloth and in direct contact with it. Worn cloth can be replaced as easily as before addition of the heating equipment. The new electrical arrangement eliminates power losses encountered in older systems and shields the bars from abrasive action of the screened material, thus preventing weak or broken contacts from corrosion of steel or copper parts, the maker says. Current is regulated by a Hannon variable-step screen-cloth heater, with voltages ranging between 5 and 15 amperes from 1,000 up to 4,000.



#### TRANSPARENT BATTERIES (12)

A new line of 2- and 3-cell industrial batteries in transparent plastic containers for stationary small power applications has been announced by The Electric Storage Battery Co., Philadelphia 1. Known as the Exide-Tytex Type COE, the new batteries combine highly sustained useful voltages and long trouble-free life with greatly reduced operating and maintenance costs and also feature unusual reliability and dependability under all operating conditions, greater output per unit of space and less weight per ampere-hour output, the maker says. The battery is designed to eliminate the need

# O-B Shells and Plugs Help GET FULL STRENGTH FROM YOUR ROOF BOLTS

Here you see the results of a typical O-B field test of roof bolt strength, and of the holding power of O-B Expansion Shells and Plugs. At the left is a roof bolt before installation in the mine roof. At the right is the same bolt, which was pulled with test equipment until it broke, after the bolt was put in place in the mine roof. Instead of pulling out of the hole, this O-B Expansion Shell and Plug unit maintained its hold on the hole wall, forcing the bolt to stretch and break.

This is vivid proof of O-B Expansion Shell and Plug holding power. This is the kind of holding power that makes sure your roof bolts will maintain their installed tension. *Properly installed, these O-B units can develop the full tensile strength of 3/4 inch roof bolts.*

Write to Ohio Brass Company for complete information regarding these powerful expansion shells and plugs. Ask for Publication No. 4768-M.

O-B Field Test Equipment in use. Bolt Puller against roof in background. Hydraulic pump and operator in foreground.



O-B Expansion Shell and Plug for 3/4-inch roof bolts and threaded rods.



4892-M

for cumbersome wood trays and their inherent cleaning problems and to permit complete flexibility of installation, using standardized inter-unit connectors. Colored pilot balls quickly indicate the stage of charge, and solution-level lines on the container show recommended electrolyte levels. Bulletin available.

#### NEW TRUCK TIRE GIVES MORE MILEAGE (13)

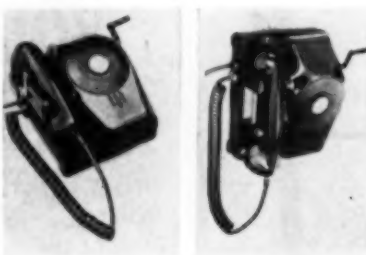
New truck tire introduced by United States Rubber Co., New York 20, and known as the all-new U. S. Royal Fleetway, embodies radical improvements in manufacture and has been designed to reduce road failures and to give up to 41% more original tread miles than previously realized in tires sold at regular prices, the maker says. Developed in the company's tire laboratories under four exclusive patented processes, the new tire sharply reduces groove cracking, features

better bonding of the rayon cords and, among other advantages, is designed with a flatter road-level profile to put more working rubber on the road. The U. S. Royal Fleetways are interchangeable for all truck or trailer wheels, single or dual.

#### SWITCH SERVES AS LOAD INTERRUPTER (14)

A new Delta-Star metal-enclosed "Disruptor" switch for 600-v AC or DC service is said by the maker to combine the functions of disconnect and load interrupter. Designed for severe usage, with its "arc-ruptor" chamber and quick-make, quick-break mechanism, the Disruptor offers safe positive load interruption and is available in ratings of 400, 600, 1,200, 2,000 and 3,000 amp, 2- or 3-pole units, with or without provisions for "Amp-trap" fuses. Full data in Bulletin 5208 from Delta-Star Electric Div., H. K. Porter Co., Inc., Chicago 12.

high and low temperatures, the maker states. Made with a mandrel-cured Reprene tube in lengths up to and including 60 ft, Republic Wiretex hose is designed to carry various types of gases or fluids under both high and low pressures. It is not weakened by constant vibration or flexing and will not rust or corrode, it is said. Full details from Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown 1, Ohio.



(19) VERSATILE BATTERY PHONE—A new "all-in-one" telephone, usable either on wall or desk and designed to fit any application with a minimum of modifications, has been produced by the Connecticut Telephone & Electric Corp., Meriden, Conn. The phone is actually a universal local-battery telephone, which can be converted to a manual common-battery phone without adding either electrical or mechanical parts. The new telephone also can be converted quickly and easily to a common-battery dial phone merely by the addition of a dial and dial bracket.



(15) A NEW SOLVENT that saves considerable time by cleaning electric motors and generators while they are still assembled has been announced by The Shaler Co., Waupum, Wis. According to the company, motors and generators can be cleaned in two different ways: (1) completely submerged in Shaler "Generator-Motor Cleaner," then plugged into electric current and run for 3 to 5 min and after removal from the dip tank dried with compressed air; or (2) by spraying of cleaner into the intake side of a motor while in operation. The cleaner does not affect wiring or insulation which is gasoline- or oil-resistant, the maker says.

(16) "ELECTRONIC STETHOSCOPE" known as the "Elec-Detec" is said to save time, work and trouble for maintenance men by quickly locating friction noises in bearings, pistons, gears, ratchets, cams, clutches and other parts. The instrument uses a metal probe which serves as a microphone, with sound impulses transmitted through an amplifier to headphones. The Elec-Detec helps diagnose the trouble and determine quickly where to make repairs without tearing down the entire equipment. Sounds can be detected at low speed that otherwise would be

heard only at high speeds. Bulletin from Anco Instrument Div., American Name Plate & Mfg. Co., Chicago 24.



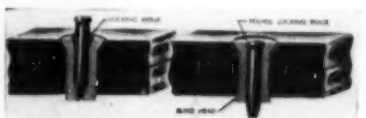
(17) CIRCUIT BREAKER FOR 125-V AC—Although it fits like a fuse in any standard Edison-base fuseholder, "Mini-Breaker" actually provides permanent, positive protection against overloads and short circuits and is the only device of its kind ever to merit listing as a "Circuit Protector" under Label Service by Underwriters' Laboratories, Inc., the maker says. It is available in 15-, 20- and 30-amp ratings for branch or main circuits delivering up to 125-v AC service. Pushing the shockproof reset button restores service after an interruption. Details from Mechanical Products, Inc., Jackson, Mich.



(18) HIGH-PRESSURE INDUSTRIAL RUBBER HOSE called Republic "Wiretex" features unusual strength, flexibility, oil and abrasion resistance, plus an ability to satisfactorily withstand effects of both



(20) SAFETY GOGGLES—The AO 481 Safety Goggle, introduced by American Optical Co., Southbridge, Mass., incorporates changes over previous models widely used, providing frontal and lateral protection through a clear plastic lens and transparent green vented binders which fit snugly to the face, the maker says. The wearer has a clear view in front and can readily see to the side though his eyes are shielded against glare by the green coloring of the transparent binders. The goggle is designed for protection over a wide area against flying foreign particles and splattering chemicals in many operations.

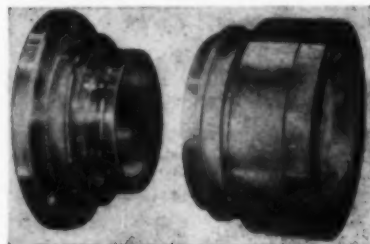


(21) RIVETS—Deutsch drive-pin blind rivets made by the Deutsch Co., Los An-



## USE THIS CARD

geles, now are distributed exclusively by the Huck Mfg. Co., Detroit. They are available in various diameters in both flush- and protruding-head types, with sleeves of stainless steel or aluminum alloy and drive pins of heat-treated stainless steel. One man can quickly install the rivets from one side of the work with an ordinary hammer or standard air hammer with flat set, the maker says.



(22) **PIPE COUPLERS**—New-type "Snap-Tite" coupler for 8-in liquid, air or gas lines features quick-connect standard flanged connections with or without a valve in the body which automatically shuts off the liquid flow when the male part is removed. The necessity of having a maintenance man for connecting or disconnecting is eliminated since anyone can make or break a connection by merely sliding a sleeve on the coupler without tools, the maker says. Snap-Tite couplers are made from 1/4 to 8 in and all swivel 360 deg. Details from Snap-Tite, Inc., Union City, Pa.

(23) **BROADENED COAL MINING TOOL LINE** announced by the Carboly Dept. of General Electric Co., Detroit 32, includes three new tungsten-carbide-tipped items, as follows: a 2 1/2-in auger drill; a 2 1/4-in auger drill; and a 1 1/2-in pin timbering drill. They are available for immediate delivery from stock and authorized coal mining distributors.

(24) **TRUCK HOIST** redesigned to make it usable in a wider range of motor trucks, the new Model 770 Galion hydraulic hoist has a load capacity of 10 to 13 tons and is suitable for most medium-duty contractor operations, the maker says. The unit has a dump angle of 50 deg and a mounting height of 14 1/2 in, weighs 950 lb and is recommended by the maker for use on 8- to 12-ft dump bodies. Full details and specifications from The Galion Allsteel Body Co., Galion, Ohio.

(25) **"PAINTED-ON" LUBRICANT** — Tough adherent load-bearing dry-lubricant finishes may now be applied to any machine or instrument surface, using or-

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Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (January, 1953)

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inary brush or spray techniques and without special equipment, with new types of "Liqui-Moly" molybdenum-base lubricating enamels now being offered on an experimental basis by the Lubricants Div., Lockrey Co., Southampton, N. Y. According to the maker, the new "Moly-amel" puts a lustrous hard greasy-feeling, but clean, coating up to half a thousandth thick on any type of surface, over practically any kind of material, including plastics, glass and ceramics. Bulletin 21-H.

(26) **NEW AUTOMOTIVE CHEMICAL**, unlike any other presently on the market, makes all internal-combustion engines perform more smoothly, last longer and run more economically, according to the maker, Alemite Div., Stewart Warner Corp., Chicago 14. Known as Alemite CD-2 Concentrate, it acts in an engine to assure free-acting valve stems, hydraulic valve-lifters, piston rings, etc., in addition to thoroughly cleaning the engine of destructive foreign matter and by-products of combustion, the company says. It does not disappear or fade, or dilute or thin the motor oil during use.

(27) **INDUSTRIAL LUMINAIRE**, Type SDP, which provides more comfortable seeing conditions by means of an upward component, is now available from the Westinghouse Electric Corp., Pittsburgh 30. It uses two slimline lamps of 38, 58 or 75 w each. The upward component, which distributes 23% of the light toward the ceiling, eliminates the severe contrast between bright luminaires and dark ceiling. Also, the use of soft colors to produce better eye comfort has been greatly aided, the maker reports. More details from the company.

four types of plastic pipe: flexible, semi-rigid, rigid high-impact and rigid polyvinyl-chloride pipe. Detailed tables giving chemical and physical characteristics of each type and simple directions on how to install and join the pipe are included.

(30) **HEAVY-DENSITY UNITS** for coal cleaning recently introduced by Wilmot Engineering Co., Hazleton, Pa., are described in its new Bulletin HD-521 on the Wilmot-Daniels cleaning system. Featured are flow diagrams for various feeds, as well as engineering and specification data for the nine standard sizes available for capacities from 50 to 800 tph. Six standard types for varying plant arrangements also are illustrated.

(31) **V-BELTS**—The "Texrope" grommet V-belt, for which 20 to 50% longer life is claimed by the manufacturer, is described in new Bulletin 20B6497A by Allis-Chalmers Mfg. Co., Milwaukee 1. The Texrope grommet V-belt is the only belt made without a splice and, according to the maker, is cooler running, shock absorbent, has one-tenth the shrinkage and one-third the stretch of other belts, offers less slip and more grip, and is 20% stronger.

(32) **HEAVY-DUTY DIESEL ENGINE**—Ingersoll-Rand Co., New York 4, offers Bulletin 10027 showing why its TS diesel is called a smaller, lighter but fully heavy-duty engine. It is a 7x8 1/2-in, 900- to 1,000-rpm diesel in the 200- to 400-hp class. Specifications, weights, performance curves and dimension tables are included.

(33) **ELECTRIC-MOTOR INSULATION**—Bulletin 10-100 from Dow Corning Corp., Midland, Mich., offers condensed reports from users on the operating conditions and performances of motors using Class H electric insulation made with Dow Corning silicones. Data are included on the typical properties of Class H components, which are said to provide longer trouble-free service life and permit use of motors considerably smaller and lighter in weight.

(34) **USE OF TWO-WAY RADIO** for better coordination of men, materials and machines is discussed in a new booklet

## EQUIPMENT BULLETINS AVAILABLE

(28) **IF YOU ARE INTERESTED** in improving the changeroom at your mine, or in planning or building a new one, a new 20-p booklet, "The Design and Layout of Industrial Change Rooms," will prove useful. Published by The Moore Co., Charleston, W. Va., the booklet discusses the factors and considerations in planning and layout of size, location, nec-

essary facilities and equipment, etc., plus details on installation and use of Moore Lockerbaskets for overhead storage of clothing, etc.

(29) **PLASTIC PIPE**—Plastic Products Div., Triangle Conduit & Cable Co., Inc., New Brunswick, N. J., offers a new 16-p booklet containing full data on Triangle's

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entitled "Instant Communication," slanted to those using materials-handling and emergency-service equipment or with plant-protection problems. It outlines the use of two-way radio in numerous industries and shows G-E equipment for a wide variety of applications. Available from General Electric Co., Electronics Park, Syracuse, N. Y.

(35) **DRILL AND CUTTER BITS**—Bulletin M-152, Kennametal, Inc., Mining Tool Div., Bedford, Pa., discusses the design, operating and application features of the Kennametal line of cutter, drill and rock bits. Data Sheets Nos. 34 and 35 also offered by the company report performance of Kennametal bits in roof-drilling at an Ohio mine and in continuous-miner service in a Pennsylvania bituminous mine, respectively.

(36) **GUIDE TO STEEL SELECTION**—4-p bulletin covers in condensed form the characteristics, mechanical properties and uses of a comprehensive list of hot-rolled and cold-finished carbon- and alloy-steel bars. Arranged to make comparisons of different types quick and easy for the jobs that come up frequently in the average shop, the bulletin is offered by Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80.

(37) **FLEXIBLE TUBING** for ventilation, fume and dust removal, and materials handling is described in new Bulletin C2-4 available from Flexible Tubing Corp., Guilford, Conn. Detailed specifications and application information are provided on Spiratube A and Spiratube R, two types of highly flexible lightweight tubing made from continuous helical coils of spring wire wound with overlapping plies of specially-treated multicoupled fabric, together with Flexflyte, smaller-diameter tubing for the same air-handling uses as Spiratube.

(38) **CORROSION PREVENTION** for maintenance-free life expectancies upwards of 25 to 30 yr on iron and steel structures and equipment is claimed in new Bulletin 62B released by the Metalizing Engineering Co., Inc., Long Island City 1, N. Y. The bulletin describes and illustrates the application of 18 basic

Metco engineering specifications of metalized zinc or aluminum.

(39) **TUBULAR-FRAME CONVEYORS**—Bulletin SF-1 offered by the E. F. Marsh Engineering Co., St. Louis 10, Mo., describes the Marco standard tubular-frame conveyors incorporating the modern, tubular truss which is said to be stronger and more rigid, makes for greater belt life and greater capacity, and resists misalignment, with the self-shedding round surfaces of the Marco frame eliminating water and material build-up. Design and application details, together with specifications, are included.

(40) **GEAR LUBRICANT**—Bulletin A-2612 details characteristics and application possibilities of "Sunep," an extreme-pressure lubricant especially developed for high-output industrial gearing and also recommended by the maker for use with heavily loaded plain bearings and screws. Copies available from Sun Oil Co., Philadelphia 3.

(41) **WINCH-HOISTS**—New Bulletin 116 offered by Lug-All Co., Wynnewood 16, Pa., provides application suggestions and full specifications on the recently broadened line of Lug-All combination winch-hoists available in units up to 1½-ton capacity weighing only 8½ lb.

(42) **STEEL HARDENER**—Bulletin from Armor-Tuf Sales Corp., New York 17, outlines the use of Armor-Tuf powder for the hardening of a wide range of tools and steel parts for greatly increased service life. Containing no cyanide, it is non-explosive and non-toxic, and is easily and quickly applied after heating the tool or part in a furnace, forge or torch, it is said.

(43) **SMALL VERTICAL PUMPS** for sidewall or submerged mounting are described in a new Bulletin 52B0975A released by Allis Chalmers Mfg. Co., Milwaukee 1, Wis. Units covered are available in capacities to 250 gpm at heads to 125 ft for coolant circulating, air conditioning, etc. Data includes helpful curves and tables to determine motor frame, horsepower, speed and current characteristics, with construction details of shaft seals and motors.

(44) **FOR GENERAL TESTING AND MAINTENANCE**, General Electric's complete line of hook-on instruments is described in Bulletin GEC-901 available from the company, Schenectady 5, N. Y. Discussed in detail are applications, operation and basic features of the G-E hook-on Type AK-1A volt-ammeter; AK-2 wattmeter; and AK-3 power-factor meter.

(45) **TUNGSTEN-CARBIDE TOOLS**—The Metal Carbides Corp., Youngstown, Ohio, offers its new 72-p General Catalog 52-G, which covers its full line of tungsten-carbide products, including cutting tools, draw dies, bushings, gages, centerless blades, rolling mill work rolls, diamond wheels and wheel dressers and solid carbide stock. Engineering data included covers speeds and feeds, brazing and grinding instructions, etc.

(46) **PORTABLE SELF-PRIMING PUMPS**—Rice Pump & Machine Co., Crafton, Wis., offers new Bulletin 52, complete with details and specifications of all models of its portable self-priming centrifugal pumps, available from 2 to 4 in., with capacities of 7,000 to 40,000 gph. All models feature modern lightweight 4-cycle air-cooled gasoline-engine power and also are available with pulleys for belt drives and flexible couplings for direct-connected electric-motor drives. A variety of wheeled and skid mountings are offered.

(47) **PORTABLE GASOLINE HAMMER**—"A Profitable Tool With Many Uses" is the title of new Bulletin 613 issued by Barco Mfg. Co., Chicago 40, describing applications for its portable gasoline hammers, such as concrete breaking, asphalt cutting, frost breaking, ground-rod driving, rock drilling, stake driving, sheathing driving and other utility jobs. Because the Barco hammers and drillers are self-powered and require no compressor as an auxiliary, they can be taken easily and quickly to even remote locations for operation by a single man, the maker points out.

(48) **DRY-CHEMICAL EXTINGUISHER**—"Redi-Flo," a nitrogen-pressurized unit developed to insure free non-clogging dry-chemical discharge, is described in Bulletin SF-1001 issued by Stop-Fire, Inc., Brooklyn 1, N. Y. Details are offered on the 3-, 5-, 10-, and 20-lb Redi-Flo units, plus descriptive data on "Dri-Kem," a new non-caking dry chemical extinguishant employed in them and also supplied separately.

(49) **WELDING EQUIPMENT**—Modern Engineering Co., St. Louis 3, Mo., offers its new Catalog 150. Covered is its "Meco" line of welding equipment designed for all types of oxyacetylene welding and cutting operations. Each item is explained in detail, with specific recommendations for its use.

(50) **AUDIO EQUIPMENT AND PARTS**—Terminal Radio Corp., 85 Cortland St., New York 7, has published a 132-p audio equipment catalog which offers 50 pp of descriptions and prices on high-fidelity home music system components and 76 pp of data on public address, institutional, recording and broadcast equipment, as well as audio test instruments and similar specialized equipment. The book is available free to individuals or firms.

# "Sinclair Lubricants Cut DOWNTIME"



Coking coal used to process steel for the Lone Star Steel Company is mined at the company's own modern, mechanized mines in McAlester and McCurtain, Oklahoma. Their coal mining machinery is protected in its rugged every day operation by 5 selected Sinclair Lubricants.

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In addition, the simplified lubrication procedure set up by Sinclair Lubrication Engineers has enabled Lone Star to cut lubricant expenditures by minimizing waste.

Invite a Sinclair Lubrication Engineer to consult with your Maintenance Superintendent. Call your local Sinclair Representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

## SINCLAIR LUBRICANTS



# PROSPERITY in the USA: Who Has It?

**H**ow prosperous are the people of the United States?

The previous editorial in this series answered this question for the average American. His prosperity has increased only slightly in recent years.

But the average tells only a part, and in many ways not the most important part of the story. Which individuals and groups have prospered more, which less? (The average, the result of a statistical calculation rather than a creation of flesh and blood, tells nothing about that.)

The purpose of this message is solely to get at the facts on this question of how prosperity is distributed. This is not easy. In spite of the crucial importance of the subject, the available information is limited. Even so it is possible to provide a rough answer to the question, "Who has the prosperity?"

## We Have Had a Revolution

The distribution of income in the United States has changed so greatly in the past twenty years that Arthur F. Burns, Research Director of the National Bureau of Economic Research, world renowned for its impartiality and technical competence, calls it "one of the great social revolutions of history." A part of this revolution is portrayed by the following table which shows that individual incomes are both much larger and much more evenly

distributed than they were twenty years ago. Clearly, a large new middle-class has been created.

DISTRIBUTION OF REAL INCOME

Dollars of Income*	Per Cent of Families in Each Income Group	
	1929	1951
Under 1,000 .....	17%	13%
1,000 - 2,000 .....	24	15
2,000 - 3,000 .....	24	18
3,000 - 4,000 .....	14	18
4,000 - 5,000 .....	6	15
5,000 - 7,500 .....	9	14
7,500 and over .....	6	7
	100%	100%

\*Adjusted for price changes to give the dollar its 1951 purchasing power.

Some light on why this income revolution has taken place can be found by tracing incomes to their source. Since 1929, for instance, employees have clearly made the biggest gains in total income. This can be seen in the next table. People who own their own businesses have done second best. Farmers, who are often thought to be doing handsomely indeed, have been outstripped in the income race by employees and businessmen. People whose incomes depend upon pensions, insurance policies, and other relatively fixed returns such as rent, interest and dividends have lagged far behind.



#### HOW REAL INCOME HAS CHANGED\*

Types of Income	Percentage Change 1929 to 1951
Wages & salaries of employees.	+123%
Income of professional men & unincorporated business ....	+108
Farm operators' income .....	+56
Rental income .....	+1
Dividends .....	+2
Interest .....	-35

\*In this and the previous table account is taken of changes in the cost of living. But adjustment for the changing tax load was not possible, as it is in the computations which follow.

#### The Biggest Gains

Employees have made the biggest gains in income, but the term "employees" covers a wide assortment of people—from the presidents of the biggest corporations to factory sweepers. How have different groups of employees prospered? Some indication is provided by results of a survey of salaries in 41 corporations made by Arch Patton of McKinsey and Company and recently summarized in the *Harvard Business Review*. This survey showed that between 1939 and 1950, after adjustment both for higher living costs and for higher taxes, factory and office employees made modest gains in income while management personnel suffered losses ranging from 40% to 60%.

While factory and office workers generally have made greater income gains than others, their gains have varied greatly from industry to industry. During the past five years, for example, steel workers' take-home pay (adjusted for both taxes and price changes) has increased by 22%, that of textile workers 9%, employees of general merchandise stores 4%, and that of laundry workers not at all.

#### What About Organization?

How have organized workers fared compared to unorganized workers? There is no round-up of facts that makes possible a direct comparison between the two. Such evidence as there is shows it is indeed an open question whether union members have done any better than others. Steel workers, for instance, who are strongly unionized are among the highly paid manufacturing workers. Farm workers are generally not unionized, and they work

in one of the most competitive industries in America.

But farm workers have made income gains which far surpass those of steel workers. Real wages of farm workers increased 2½ times more than those in the steel industry between 1939 and 1952. This fact may prove nothing more than that, in a period of inflation and manpower shortage, the less skilled workers whose incomes are ordinarily low make the biggest percentage gain in income. Further support for this conclusion is found in the construction industry where real wages of unskilled labor increased 37% between 1939 and 1952, while those of skilled labor increased only 4%.

#### Why Most Incomes Are Higher

Prosperity, who has it? We may conclude that workers have been getting much more of it lately than managers or property owners, that unskilled wage and salary earners have made the largest gains, and that income generally is much more evenly distributed.

Where has the money come from to raise low bracket incomes? It has come partly from an increase in the total national income, but partly also from cutting down the share received by people in the highest income brackets. While the top 5% received 33.5% of the income after taxes in 1929, their share of income has now been cut about in half. For every \$11 of increase in income to the lower 95% of income receivers, about \$7 has come from increased production, and about \$4 by taking that amount from the top 5%.

Top bracket incomes have now been cut so deeply that the possibilities of increasing the income of the rest of the people by "soaking the rich" have largely disappeared. Indeed, if all of the income after taxes of everyone earning over \$25,000 in 1951 was taken away and redistributed among the remaining Americans, each person would receive only about \$65.

The significance of this revolution in income distribution is clear. It is that there is only one way by which the great mass of us Americans can continue to increase our individual prosperity. This is by earning the increase through more and more efficient production. In plotting the economic course of the U.S.A. this fact is of decisive consequence.

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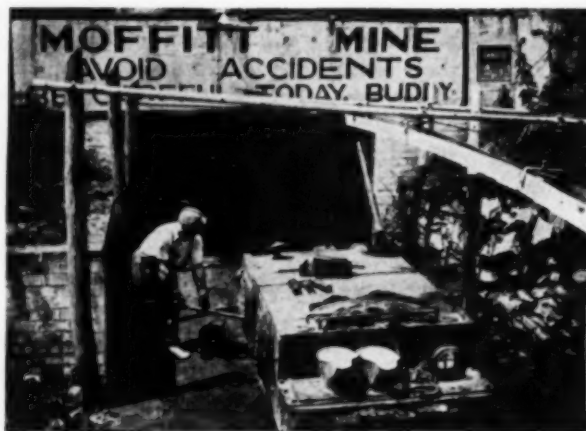
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# NEWS Round-Up

## Truman Okays Mine Contract; Creates Stabilization Crisis

JOHN L. LEWIS got official approval Dec. 3 of the 40c a day denied by the Wage Stabilization Board—through the personal intervention of President Truman.

The action—expected so long that it was not news, except for the President stepping in personally—split the WSB wide open and momentarily left the country's stabilization program at a standstill. Archibald Cox, Harvard professor, who was chairman of the board, resigned the next day in protest of Mr. Truman's disregard of the board's decision, and the five industry members followed along by resigning en masse 2 days later. Nine of the 14 regional boards reportedly also were made inoperative by resignation of industry representatives.

The approval had seemed a sure thing, by some means or other, ever since Mr. Lewis' urging of miners back to work following his dramatic Sunday night visit to the White House Oct. 26, accompanied by Harry M. Moses, BCOA president. Although Roger L. Putnam, Economic Stabilization Administrator, immediately said that no "deal" had been made in that pre-election meeting with the President and that the case would be judged only on its merits, the miners' return to work indicated that Mr. Lewis, at least seemed satisfied that the administration's consideration would be more than sympathetic. As a matter of fact, Mr. Lewis was reported to have felt quite confident of the outcome as he sailed for South America to attend a labor conference the week before Mr. Truman announced his action.

### INSURES CALM ATMOSPHERE

In his statement, Mr. Truman said that he was overriding the WSB to insure that "as calm and stable an atmosphere as possible" would be present for Gen. Eisenhower when he took office Jan. 20. Citing the possibilities of a work stoppage in the mines if the full \$1.90 daily provided under the new contract was not granted, Mr. Truman said: "I am not willing to take action that will create such a crisis for my successor." Pointing out that he was going against the recommendations of Mr. Putnam and Henry H. Fowler, head of the Office of Defense Mobilization, as well as those of the WSB, Mr. Truman also said that "I believe considerations outside stabilization are

major importance in this matter," and that he was convinced that his decision would not have a serious unfavorable effect on stabilization "if the special circumstances under which it is approved are clearly understood."

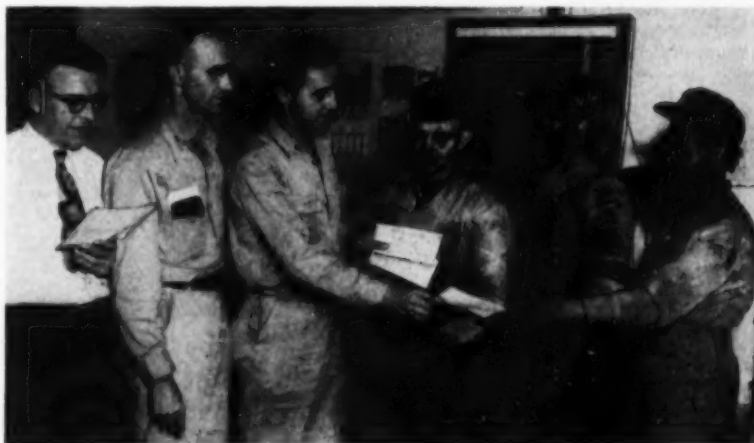
### MINERS A SPECIAL CASE

Among the special circumstances he cited was the fact that though the cost of producing coal would rise by perhaps 5 or 6c a ton, "producers would find little practical benefit in seeking price ceilings . . . because very few of them could collect those higher prices in the market place." His action also would

have little effect on other wage levels and on collective bargaining generally, he stated, since: "Everyone knows that the wage increases customarily given coal miners are, as a practical matter, discounted by other workers who have never envied the miner his hazardous, unpleasant and unhealthy work, his living conditions in isolated communities

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### W. Va. Mine Leads J&L With \$5,950 "Safety Savings"

TOP EARNERS in the 1951 "Safety Savings" program of the Jones & Laughlin Steel Corp. were the employees of the Black Eagle mine, Mullens, W. Va., who chalked up \$5,950 as a result of improved accident experience for distribution to local organizations. Shown at the presentation in the Black Eagle office, H. T. Bartram (third from left), general superintendent of Twin Branch and Black Eagle mines, hands a \$988 check to Willie Grant for Holiness Church of God. Others include: R. M. Neal (left), committeeman of Black Eagle Playground, which received \$2,000; Bert Keener, Black Eagle superintendent; Bud Whittington, Black Eagle Community Church, \$1,975; and James Jamison, Galilee Baptist Church, \$987. Originally started in 1949 because the corporation "does not want to make money out of safety," the plan permits J&L's 42,000 employees in 26 plants or divisions to contribute their savings in reduced insurance and compensation payments, as compared with a 5-yr base period, to local welfare and hospital activities. In the first year of the plan, the Vesta coal mines led the entire organization, with savings of \$13,775.



and his sporadic employment. The same reasons which keep other workers from wishing to become coal miners also keep them from expecting—or their employers from offering—wage increases to match every increase the miner receives.”

After trying for over a week to recruit industry representatives to replace those who quit WSB in protest, Mr. Putnam finally gave up and announced Dec. 14 that the President had authorized him to

name four public members remaining on the board as an interim board empowered to act on the backlog of some 12,000 wage cases before it. The labor representatives on the board were expected to stand by as advisers and resume their places on the board should industry decide to end what Mr. Putnam called a “boycott.” The regional boards were expected to resume operation on the same basis.

## Lewis Sends Japanese Miners \$10,000 for Strike Support

The Japanese Federation of Coal Miners Unions received a check for \$10,000 Dec. 15 from John L. Lewis, UMWA head, 1 day before they were forced by the government to end their 60-day-old strike for higher wages. Acting under emergency powers of the nation's labor law, the Japanese Premier instituted a 50-day “cooling-off” period. According to reports, Mr. Lewis' support of the miners had been asked for by Dick Deverall, head of AFL bureau in Japan. The some 200,000 miners on strike had been seeking a wage increase from the equivalent of \$1.52 to \$2.94 a day.

# News Briefs and Trends

## McKinlay Miner Rights Acquired by Goodman

The Goodman Mfg. Co., Chicago, has announced its further entry into the field of continuous mining with the acquisition of patent rights, designs and know-how permitting construction and sale of a machine to be known as the Goodman-McKinlay miner. This type of machine, originally developed by Edward S. McKinlay, employs a horizontal boring principle, which has been developed and refined by James S. Robbins, consulting engineer, who will continue to give his services to further development. The first machines are scheduled for completion by Goodman in 1953. They will be for off-track operation in seams of coal of varying height. The company intends to carry on the development of its original combination cutting and loading machine, which will complement the boring-type machine just acquired.

## Midwest Operator Groups Resign From BCOA

A serious breach in the ranks of the Bituminous Coal Operators' Association was indicated in mid-December with the report that the Indiana Coal Producers' Association and the Illinois Coal Operators' Association had resigned from the nationwide bargaining organization. Fred S. Wilkey, secretary of the Illinois association, stated that his organization had resigned so as to be free to carry on its own negotiations with the UMWA. However, another published report indicated that the main reason for the action was that Midwest operators had been assured that they would not be shut down during future wage bargaining, as long as they agreed in advance to accept the terms negotiated with the BCOA. Similar assurances were publicly reported during the 1952 contract negotiations.

## BCR to Intensify Research, Operate Columbus Laboratory

Operation of an industry research laboratory was authorized by directors of Bituminous Coal Research, Inc., at their annual budget meeting in Pittsburgh, Dec. 10. A building is to be leased in Columbus, Ohio, to house the organization's staff there and provide facilities for design, development, and pilot-plant testing of equipment and processes being

investigated under BCR's general research program. Directors of the coal industry's cooperative program outlined four major divisions of research effort in 1953 to increase user satisfaction in the following markets: (1) residential and agricultural; (2) commercial and small industrial; (3) general industrial, including utilities; and (4) gasification, carbonization and chemicals from coal. Some technical activities will be continued at a somewhat reduced rate to permit greater attention on the four principal divisions, with research on coal-burning equipment for residential, agricultural, commercial and small industrial uses to be intensified. The election of Julian E. Tobey, president, Appalachian Coals, Inc., to the BCR board of directors also was announced by the organization Dec. 15.

## Diesel Use Underground Before W. Va. Supreme Court

Review by the West Virginia Supreme Court of a lower court ruling prohibiting the use of diesel locomotives underground was granted the Pond Creek Pocahontas Co. and National Mine Service Co. Dec. 15, on a petition filed late in November. The petition sought to set aside a decision of the Kanawha County Circuit Court upholding Arch J. Alexander, former chief of the Department of Mines, in his ruling of last January that the state law prohibited operation of the diesel unit in underground coal mines. Pointing out in their petition that both the USBM and Mr. Alexander personally had found the locomotive “completely safe and not



## U. P. Mine Receives Fourth Consecutive Safety Trophy

PARTICIPATING in the ceremonies at which men and management of Reliance No. 7 mine of the Union Pacific Coal Co. received the “Sentinels of Safety” Trophy for the fourth consecutive year were: James Westfield (left), chief, Health and Accident Div., USBM; I. N. Bayless, president, The Union Pacific Coal Co.; Theodore Marvin, director of the Hercules Powder Co.'s *Explosives Engineer* magazine, which donates the trophy; Lawrence Welsh, Reliance mine superintendent; and Milton Friel, duckbill operator, who accepted the trophy on behalf of the men. The presentation, at a dinner given by the company for the men and their wives, marked the mine's 1951 standing at the top of the bituminous group in the nationwide safety competition, the fourth year that the mine had operated without a lost-time accident. According to last reports, it was continuing its no-accident record in 1952, and had worked 1,937,818 man-hours from Jan. 1, 1948, through Oct. 31, 1952.



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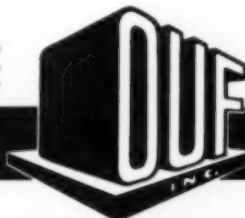
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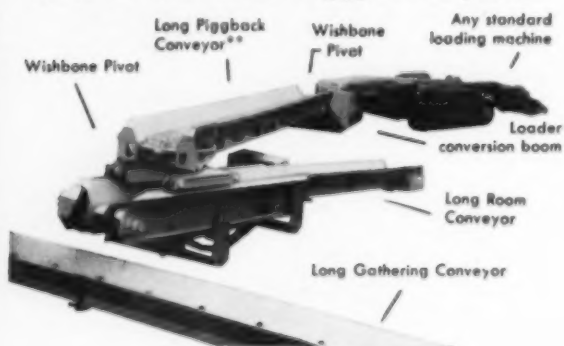


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harmful to the health of any miner," the companies said that if the state law flatly prevents use of the unit, regardless of whether the engine is harmless, then the law's objective of protecting miners is defeated. The lower court's decision, if upheld, "will prevent a distinct improvement in safety conditions in coal mines," they said. Pond Creek Pocahontas purchased the first unit manufactured by National Mine Service in 1951, but has been prevented from using it underground by the Alexander interpretation of the state law. Although the locomotive has been approved as permissible equipment by the USBM, the UMWA has vigorously protested its operation underground.

### Ohio Overland Belt to Try Legislature for Third Time

The proposal for a long-distance conveyor belt from the Ohio River to Lake

Erie is scheduled to make its third try for rights of eminent domain in the Ohio Legislature this winter, reports indicate. The plan, which is strongly opposed by the railroads, was killed in committees in the two previous sessions and never reached the floor of the legislature for a vote. Under the proposal to be submitted this year, the Riverlake Belt Conveyor Lines, Inc., backed by the Akron, Canton & Youngstown R.R. and Goodyear Tire & Rubber Co., has switched the Lake terminus of the line from Lorain to Cleveland in hope of obtaining legislative support from the Cleveland area. As originally announced (*Coal Age*, March, 1949, p 122), the belt line was to be 103 mi long, carrying coal one way and iron ore the other at considerable savings in transportation costs. At the same time, B. F. Goodrich Co. reportedly is working on a plan for a 5-mi \$10 million belt line from the Cleveland harbor to steel mills in the Cuyahoga valley.



**J. H. EDWARDS** (left) and **Ivan A. Given**, editor of *Coal Age*, examine a bound volume of letters of appreciation citing Mr. Edwards' more than 25 yr of service to the industry through *Coal Age*. The volume, presented at a staff luncheon in New York, contained letters from company associates and from coal and other industry officials.

### J. H. Edwards Joins Twenty-Five Club

J. H. Edwards, associate editor, *Coal Age*, with headquarters at Huntington, W. Va., was initiated into the McGraw-Hill Twenty-Five Year Club Dec. 3 in recognition of his more than 25 yr of service to the coal-mining industry as a member of the *Coal Age* staff.

Mr. Edwards came to *Coal Age* from the Elkhorn Piney Coal Mining Co., where he had served for 6 yr as mechanical and electrical engineer for 18 mines at six different operations. Before that, after graduation from the University of Iowa with a B. S. in electrical engineering in 1913, Mr. Edwards was "special assistant to the electrical engineer" of the Rock Island Lines, with headquarters at the Silvis (Ill.) shops.

He was successively promoted to electrician foreman at Silvis, chief electrician of shops and division, and then supervisor of stationary power. The latter position involved supervision of 57 power plants and 200 steam pumping stations. In June, 1917, he was awarded the degree of "Electrical Engineer" by the University in recognition of investigations and tests compiled for its benefit.

Those who know Mr. Edwards appreciate his enthusiasm for outdoor activities, which have included interest in Indian mound building and petroglyphs. His other hobbies include photography, travel, water sports, Indian artifacts, antique Colt revolvers, other antique guns, and old cylindrical Edison records.

### W. Va. C of C Hits Committee Investigating Widen Strike

A bitter denunciation of the special committee appointed by Gov. Patten to investigate the lengthy strike at the Widen, W. Va., mine of the Elk River Coal & Lumber Co. was released Dec. 5 by the West Virginia Chamber of Commerce. In a report to its members, the Chamber said that the State police had made "only the most timorous attempts at law enforcement," the UMWA was attempting to "blast into submission" one of the state's few remaining strongholds of independent business, and the three committee members all had records partisan to labor. In reply to the statement, William Blizzard, president, District 17, UMWA, said that the Chamber is "trying to protect absentee owners who have been robbing the people of West Virginia for years." Mr. Blizzard's refusal to disqualify himself as an ex officio member of the committee resulted in the walkout during the 2-days of public hearings of the attorneys of the mining company, the Independent Employee's League of Widen Miners, and two law and order organizations formed by Widen residents. The strike, which started Sept. 20, had been marked by repeated violence. An FBI investigation of the dynamiting of two railroad bridges was reportedly completed Dec. 1 but no announcement of the findings was released. In Grundy, Va., six UMWA members were granted a second court delay Dec. 13 on a charge that they had violated a court order prohibiting interference with non-union workers. The action was brought by Marshall Whaley, whose tipple at Oakwood had been picketed for 6 wk.

### Early Sampling Urged For Government Coal Bids

Coal-mine owners, marketing agencies and others intending to submit bids for delivering coal to the U. S. Government during 1953 should make early application for federal sampling and analysis of their products, the USBM said Dec. 11. R. F. Abernethy, chief of the Bureau's coal-analysis laboratories in Pittsburgh, said that his limited staff must operate under close schedules if it is to meet all requests. The Bureau now is taking field samples and running laboratory tests on coal to be offered next spring and summer when the Government calls for bids for the 1953-54 heating season. The government buys approximately 8 million tons of coal yearly, all of which must be backed by a guaranteed analysis from the seller. Those interested in having their coal analyzed or sampled should write immediately to Mr. Abernethy at the Central Experiment Station, 4800 Forbes St., Pittsburgh 13.

### Lehigh Navigation Offers To Buy Dealer Inventories

A new wrinkle was added to the coal business Dec. 10 when Lehigh Navigation Coal Co. announced a program to pay

**Continued on p 148**

# Kentucky Mining Institute

**Latest Developments Covered at Annual Meeting of Kentucky Mining Institute Include:**

**Longwall Mining  
Oil- and Gas-Well Problems  
Roof-Bolting Practices  
Coal's Market Position  
Cable Maintenance  
Federal and State Laws**

**LONGWALL MINING**, germanium from coal, roof-bolting, oil and gas wells driven through coal seams and gas storage beneath, coal's market position, Federal and Kentucky mine laws, cable maintenance and a report on fires and explosions in Kentucky were featured subjects at the 13th annual meeting of the Kentucky Mining Institute, held at the Phoenix Hotel, Lexington, Nov. 13-14. Registration for the 2-day meeting was 262. F. P. Kerr, general manager of the Eastern Coal Corp., Stone, and institute president, occupied the chair at all sessions.

E. K. Newman, general superintendent, Wisconsin Steel Nos. 1 and 2 mines, International Harvester Co., Benham, was elected president, and A. D. Sisk, Iron and Health Div., Pittsburgh, was re-elected secretary-treasurer for the ensuing year. Joseph E. Moody, president, Southern Coal Producers' Association, spoke at the banquet attended by 243 members and guests, with M. K. Eblen, president, Kentucky Mine Owners' Association, serving as master of ceremonies.

Reporting for the textbook committee, J. H. Mosgrove, secretary, Big Sandy-Elkhorn Mining Institute, Pikeville, said that 2,000 copies of the new 436-p "Mining for Practical Men" (reviewed in *Coal Age*, August, p 179) have been printed and that copies are available for \$4.50 each in lots of less than 12 copies and at \$4 each for more than 12. W. B. Sturgill, secretary of the Hazard Coal Operators' Association and chairman of the institute's education committee, discussed its general activities and then called for regional reports from each of the following secretaries of the five local institutes: Mr. Mosgrove; E. A. Starling, Harlan; Ira Inman, Cumberland Valley; Julius Ferrell, Pond Creek-Tug River; and Robert Dickson, Kentucky River. Robert Estep, a student at the University of Kentucky and president of the Junior Chapter of the Kentucky Mining Institute, reported that the chapter now has 35 members and meetings are held twice a month.



**GERMANIUM IN COAL**, Roof-Bolting, Oil and Gas Wells Through Coal—Seated: A. D. Sisk, chief, Kentucky Department of Mines and Minerals, and institute secretary-treasurer; C. H. Hodgson, Mine Safety Appliances Co., program committee; F. P. Kerr, Eastern Coal Corp., retiring institute president; and R. L. Smith, Mine Safety Appliances Co., program committee. Standing: M. H. Forester, Pittsburgh Consolidation Coal Co.; William Husk, West Kentucky Coal Co.; and Dr. A. J. W. Headlee, W. Va. Geological Survey.



**COAL'S POSITION**, Federal Mine Safety Act, Cable Maintenance—William McGregor (left), chief electrician, West Kentucky Div., Bell & Zoller Coal & Mining Co.; James Westfield, USBM; Joseph Schlickau, mining engineer, Stone; Carroll P. Hardy, chief engineer, Appalachian Coals, Inc.; and William H. Roll, executive assistant, Department of Mines and Minerals.

## Longwall Offers Opportunities For Low-Coal Operations

"Many low-coal operations waging a desperate fight to keep alive," said J. A. Schlickau, mining engineer, Stone, Ky., "could double their production per man-shift and, with full recovery, the lifetime of their properties." Continuing, he said, "Mines shut down could be re-opened and low seams heretofore considered unworkable could be mined, thus adding

greatly to the already limited reserves of valuable metallurgical coal." He was referring to what he termed the "Fast Planer," which has been used on modified longwall at the Stotesbury No. 11 mine of Eastern Gas & Fuel Associates, at Helen, Raleigh County, W. Va. (*Coal Age*, November, 1952, p 76).

"Modern Longwall Mining and Its Possibilities" was the subject of Mr. Schlickau's 22-p paper. He covered the history of longwall in the United States, practices in Europe, experiences with the Samson-Stripper, Mecco-Moore, Dosco Miner and Fast Planer on this continent and made a few predictions. "The future American longwall will consist of development sections for main and butt

**INDUSTRY MEETING —  
A Special COAL AGE  
Staff-Written Report**

# Stages 13th Annual Meet



**GUEST SPEAKER** at the banquet was Joseph E. Moody (standing), president, Southern Coal Producers' Association. Seated are: James Westfield (left), chief, Health and Safety Div., USBM; L. P. Johnson, president and general manager, Crummies Creek Coal Co.; M. K. Elben, president, Kentucky Mine Owners' Association; A. D. Sisk; F. P. Kerr, general manager, Eastern Coal Corp., and retiring institute president; and W. H. Tomlinson, chief, Accident Prevention and Health Div., USBM, Pittsburgh.



**FIVE INSTITUTE SECRETARIES** presented regional reports for the committee on education—Robert Dickson (left), Kentucky River Mining Institute; Julius Ferrell, Pond Creek-Tug River Mining Institute; Ira Inman, Cumberland Valley Mining Institute; J. H. Mosgrove, Big Sandy-Elkhorn Coal Mining Institute; and E. A. Starling, Harlan Mining Institute.

entries and one double-shifted longwall of about 600 ft on butt entries 3,000 to 4,000 ft long, with the belt in the center heading and daily longwall production of 2,000 to 3,000 tons," Mr. Schlickau suggested. Mentioning two 1,500-ft longwall double units operated with the Fast Planer in Jacobi mine in the Ruhr and producing 2,000 tons each day, he concluded by emphasizing that "What can be done at the Ruhr should and could be done better in the U. S."

## Wood and Steel Bolting In Western Kentucky

Costs of 5c per ton of No. 9 seam coal mined under roof supported with

wood pins, as compared to 19.5c per ton under steel bolts with none reclaimed, was indicated by W. L. Husk, assistant chief engineer, West Kentucky Coal Co., Madisonville, in a 19-p paper, "Roof Bolting in the Western Kentucky Coal Fields." Only a short part of his paper, however dealt with wood pins and most of that information he credited to Sterling Lanier Jr.'s paper presented at the Cincinnati meeting of the American Mining Congress (*Coal Age*, June 1950, p 91). In one mine, 1½-in by 36-in wood pins used, cost 15c each. A three-man crew drills for and installs 100 pins per shift and also does the coal drilling for 20 cuts. Not all places in this mine are wood-pinned. Belt lines, manways and

## New Officers Kentucky Mining Institute

**PRESIDENT**—E. K. Newman, general superintendent, Wisconsin Steel Nos. 1 and 2 mines, International Harvester Co., Benham.

**VICE PRESIDENT**—S. M. Cassidy, president, Consolidation Coal Co. (Ky), Jenkins; S. A. Fox, manager, southern mines, Blue Diamond Coal Co., Middlesboro; and Herman Knight, chief engineer, Bell & Zoller Coal & Mining Co., Madisonville.

**SECRETARY-TREASURER**—A. D. Sisk, chief, Department of Mines and Minerals, Lexington.

**DIRECTORS** — Frank L. Smith, general superintendent, Leatherwood No. 1 mine, Blue Diamond Coal Co., Leatherwood; V. D. Picklesimer, general superintendent, South-East Coal Co., Whitesburg; J. W. Atkins, vice president, Perkins-Harlan Coal Co., Liggett; G. M. Petterson, chief engineer and operating manager, West Kentucky Coal Co., Madisonville; J. T. Parker, superintendent of coal properties, Inland Steel Co., Wheelwright; Fred F. Stewart, superintendent, Jewel Ridge Coal Corp., Hazard; S. J. Dickenson, general manager, Mary Helen Coal Corp., Coalgood; Bradley Sparks, general manager, W. G. Duncan Coal Co., Greenville; C. J. Barton, general superintendent, Kentucky Ridge Coal Co., Field; Robert L. Nicols, plant manager, Black Star Coal Corp., Alva; Douglas L. Krickmer, superintendent, Pond Creek Colliery, N. & W. Ry. Co., Williamson, W. Va. and F. P. Kerr, general manager, Eastern Coal Corp., Stone.

haulageways are held up by steel pins.

Mr. Husk went into considerable detail in describing the character of roofs in the No. 11 and No. 12 seams, where conventional wood timbering was costing around 24c per ton. As a result of this cost, two large mines in Hopkins County have been roof-bolting with steel bolts for 2 yr or more. In both seams, bolts suspend the immediate roof rather than tying strata together to form beams. Ordinarily, the gob top of No. 11 is supported by short bolts anchored in the 2- to 6-ft limestone and in this anchorage a 70-lb torque will provide a pull of 25,000 lb. Where the limestone thins to a few inches, long bolts are used to seat

(Continued on page 166)



## Personal Notes



### Pittsburgh Consol Names Shoemaker and Cassidy

**G. A. SHOEMAKER** (left), vice president, Pittsburgh Consolidation Coal Co., Pittsburgh, was elected executive vice president Dec. 12, and **S. M. Cassidy**, president of the Consolidation Coal Co. (Ky.) Div., was made a vice president of the parent company, with headquarters in Pittsburgh. Mr. Cassidy also will continue to serve in his former capacity. Announced at the same time was the resignation of **George M. Humphrey** as a member and chairman of the board of directors. Mr. Humphrey was recently named Secretary of the Treasury in President-elect Eisenhower's new cabinet. The directors expressed their appreciation to Mr. Humphrey for his part in the formation of the company and for his great help in early planning and operation during the past 7 yr.



### Alabama By-Products Advances Chase and Hager

**WILLIAM C. CHASE** (left), general superintendent of mines since 1936, last month was named executive assistant and general mining consultant for the Alabama By-Products Corp., Birmingham, Ala. **Henry J. Hager**, formerly assistant general superintendent of mines, was advanced to succeed Mr. Chase. A graduate of the University of Alabama, Mr. Chase began his career in the coal industry in Mexico, coming to Birmingham in 1913. He joined Alabama By-Products in 1928 as superintendent of the Bradford mine, a post he held until named general superintendent in 1936. Mr. Hager, associated with the company since 1931, and also a graduate of the University of Alabama, was superintendent of various company mines before becoming assistant general superintendent in 1947. Mr. Hager's father was for many years general superintendent of the Pratt Div. of the company's mines.

**W. E. Hess**, former general superintendent of coal mines, last month was named manager of coal mines, Jones & Laughlin Steel Corp., Pittsburgh, Pa. He has been associated with the company since 1945. Other personnel changes announced were: **David Page**, 33 yr with the company, named general superintendent for the Vesta-Shannopin Coal Div., California, Pa.; **Matt Blair**, superintendent, and **Clarence Pelky**, foreman, Mine No. 5; **Ray Engle**, foreman of Mine No. 4; and **Thomas Park**, safety director, Coal Div.

**James Jones** has been appointed assistant superintendent, Mather collieries, Pickands, Mather & Co., Mather, Pa. A graduate of Pennsylvania State College, he had been associated with Bethlehem Mines Corp., Hanna Coal Co. and U. S. Steel Co.

**Harold Price**, formerly superintendent, Audenried Mines, Glen Alden Coal Co., Wilkes-Barre, Pa., is now president and general manager, Price Coal Co., which recently purchased assets of the Eagle Hill Coal Co. **David Roderick**, formerly associated with the Salem Hill mine, Palo Alto, Pa., is preparation manager. The company plans to prepare coal obtained from culm-bank mining, as well as from stripping contractors.

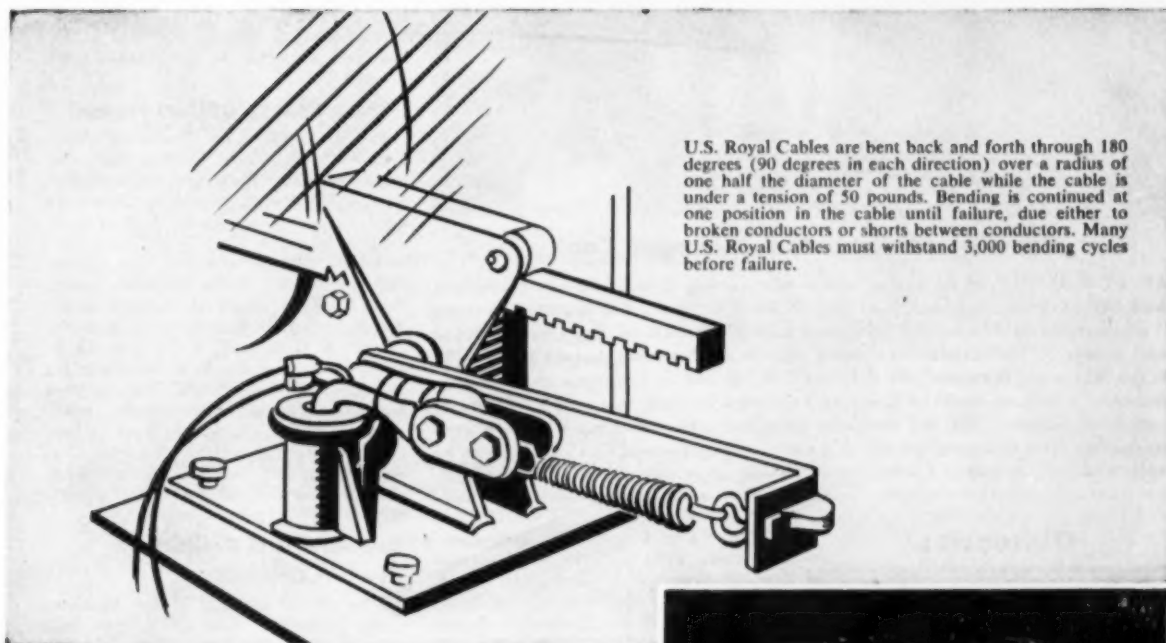
**Philadelphia & Reading Coal & Iron Co.**, Philadelphia, Pa., has appointed **Earl M. Klees**, since 1951 assistant to the division superintendent, Ashland Div., to the newly created post of chief safety engineer. After completing courses at Pennsylvania State College, Mr. Klees began his career as a driver at Colonial Colliery, Natalie, Pa., in 1925, and worked in various jobs until made fire-boss, later becoming inside superintendent at Colonial and Greenough mines, Colonial Collieries Corp. Before joining the Bureau of Mines in 1944 as a Federal mine inspector, he was superintendent of mechanical mining for Delano Anthracite Coal Co.

**Boone County Coal Corp.**, Sharples, W. Va., has appointed **E. H. Greenwald** general manager of the company, and **T. W. Cline**, superintendent. Mr. Greenwald worked for the company while attending the University of Pittsburgh School of Mines and, upon graduation, worked in the various capacities of engineering, production and management. Mr. Cline, formerly general mine foreman and a veteran of many years with Boone County, succeeds the late **H. L. Copher**. The company also announced the promotions of **O. M. Smith**, assistant to the general mine foreman, Zone 1, Boone No. 2 mine; **R. P. Skiles**, assistant to the general mine foreman, Zone 2, Boone No. 2 mine; and **B. C. Turner**, to general mine foreman, Boone No. 2 mine, succeeding Mr. Cline.

**Frank Bennett**, superintendent of the Crested Butte mine, Colorado Fuel & Iron Corp., Denver, Colo., since 1947, has been appointed superintendent of the Morley mine. He joined the company in 1910 as secretary to the manager of the mining department, working with both the sales and operating divisions.



# What other portable cables can pass this test?

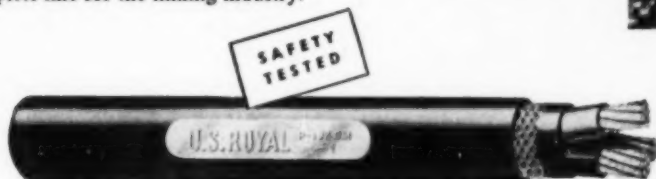
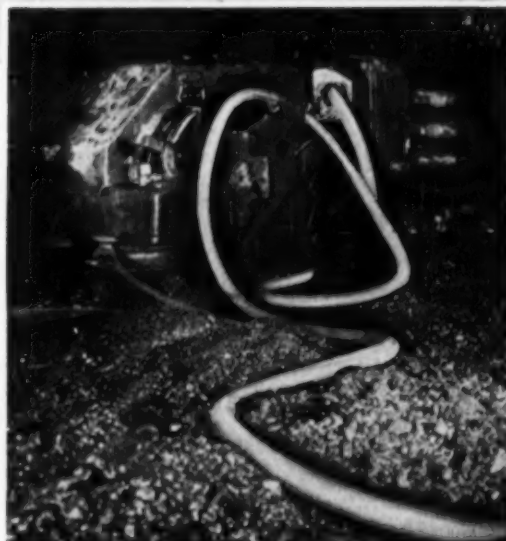


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## Gasoline Stations Sell Packaged Coal

**LATEST WRINKLE** in packaged-fuel merchandising is this new low-cost depot which the St. Paul Packaged Fuel Co., St. Paul 1, Minn., has installed in some 50 gas stations in Minnesota, Wisconsin and North Dakota. Each 4x6 ft depot holds 3 tons of high-grade Pocahontas coal in 15-lb packages, sold five for \$1 for use in stoves, furnaces and fireplaces. While not as automatic as a vending machine, the depots, made of Masonite Tempered Duolux, cost only a fraction of a machine designed for the purpose. Previously, the gas-station dealers were responsible for warehousing and inventory, an arrangement that was likely to be haphazard. The company's sales tripled shortly after the plan was inaugurated.

## Obituaries

**Ernest Prudent**, 57, general superintendent, Bell & Zoller Coal & Mining Co., Zeigler, Ill., died Dec. 9 enroute to a hospital following a heart attack suffered at his home. Mr. Prudent, who entered the mines at an early age in Centralia, joined Bell & Zoller in 1917 as an electrician at Mine No. 1. In 1945 he was made superintendent of the mine and 3 yr later was promoted to general superintendent for properties in the area. His father, E. A. Prudent, who died in 1944, was a mine superintendent for the company. Mr. Prudent's brother, Norman, was a mine superintendent for the Hanna Coal Co. until he resigned in 1951 to become superintendent for the Southwest Potash Corp., Carlsbad, N. M. He was killed last September by a fall of rock in the potash mine.

**C. C. Sexton**, superintendent, Moore Branch Coal Co. and Joyce Coal Co., Hitchens, Ky., died Nov. 20 at the Stovall Hospital, Grayson, Ky.

**W. A. Wilson**, 55, superintendent, Widen mine, Elk River Coal & Lumber Co., Widen, W. Va., died Nov. 7 at his home of a heart attack. He had been a resident of Widen for most of his lifetime.

**Carroll B. Huntress**, 67, vice president, Republic Coal & Coke Co., New York, died Nov. 29 of a heart attack, at his home in Mt. Vernon, N. Y. Widely known in the industry, he was with National Coal Association from 1924 to

1934, the last 4 yr as executive secretary. From 1934 to 1936 he was president of Appalachian Coals, Inc. In recent years, Mr. Huntress was chairman of the National St. Lawrence Project Conference, in addition to his duties with Republic Coal & Coke.

## Association Activities

### Southern Appalachian Group Re-elects Officers

Southern Appalachian Coal Operators' Association, at its annual meeting held Nov. 21, in Knoxville, Tenn., re-elected officers as follows: president, C. R. Griffith, president, Southern Coal & Coke Co.; first vice president, S. G. Moore, president, Moore Coal Co.; second vice president, D. E. Griffith, president, Pruden Coal & Coke Co.; and executive secretary, Harry S. Homan. The following directors were elected: S. G. Moore, chairman; S. C. Boyer, Gordon Bonnyman, H. D. Faust, C. R. Griffith, D. E. Griffith, L. C. Hammock, H. C. Hutcheson (Warren Hayden, alternate), Fred Loving Jr., D. A. Perkins, W. T. Ray, Jacob T. Reams and R. L. Stearns Jr.

### Indiana Trade Association Holds Annual Meet

Coal Trade Association of Indiana, at its annual meeting Nov. 7, in Terre Haute, elected J. W. Morgan, president, Ayrshire Collieries Corp., as president; and David Ingle Jr., president, Ingle Coal Corp., as vice president. Named

directors for the coming year were: Gregory S. DeVine, vice president, Truax-Traer Coal Co.; W. S. Webster, vice president, Walter Bledsoe & Co.; H. B. Lee, president, Maumee Collieries Co.; Reed Moyer, assistant to the vice president, Central Indiana Coal Co.; Phil H. Templeton, secretary-treasurer, Templeton Coal Co.; L. B. Girard, sales manager, Illinois & Indiana Southern Coal Co.; V. C. Kibler, treasurer, Blackfoot Coal & Land Co.; O. L. Scales; W. H. Cook, president, Pandora Coal Co.; R. G. Nunn, vice president, Hickory Grove Coal Mining Corp.; H. P. Smith, president, Princeton Mining Co.; and L. G. Wasson, president, L. G. Wasson Coal Mining Corp.

### Harlan County Officers Named

Harlan County Coal Operators' Association, at its annual meeting Nov. 20, re-elected the following officers: president, J. S. Greene, president, Garmeada Coal Co.; vice president, Jack Taylor, general manager, High Splint Coal Co.; secretary, George S. Ward. The following were named to the executive board: Pearl Bassham, Harry M. Bennett, Kenes Bowling, S. J. Dickenson, F. L. Dupree, Charles S. Guthrie, L. P. Johnson, D. A. Perkins, R. C. Scott, A. F. Whitfield Jr., and B. W. Whitfield III. The meeting featured talks by Roy Carson, traffic manager of the association; Tom Pickett, executive vice president, National Coal Association; and Joseph E. Moody, president, Southern Coal Producers' Association.

### Southern Coal Producers Re-elect Officials

The annual meeting of the Southern Coal Producers' Association was held Dec. 9 at Washington, D. C., electing directors who, in turn, re-elected the following officers: Joseph E. Moody, president; Walter R. Thurmond, secretary and Laurence E. Tierney Jr., treasurer. There were two changes in the director's list. Mr. Moody was elected director-at-large, and J. T. Reams, Middlesboro, Ky., was elected a director to succeed Charles Griffith, Southern Coal & Coke Co.

### Pocahontas Group Holds Meet

At the annual banquet of the Pocahontas Electrical & Mechanical Institute, Dec. 1, in Bluefield, W. Va., the following officers were elected: John Schroder, U. S. Steel Co., Gary, W. Va., president; H. E. Mauck, Olga Coal Co., vice president; Jack Pero, Pocahontas Fuel Co., vice president; S. S. Cooper, American Coal Co., secretary; J. B. Wooldridge Jr., Pocahontas Operators' Association, assistant secretary; and B. B. Housman, Pocahontas Operators' Association, treasurer.

### Inspectors Elect Officers

Pennsylvania Bituminous Mine Inspectors' Advisory Association has elected George Steinheiser, of Uniontown, president, succeeding C. H. Maize. Other officers elected were J. V. McKenna, vice president; A. J. Mair, secretary; and W. R. Cunningham, recording secretary.

# STOP

## cause of wire wear!

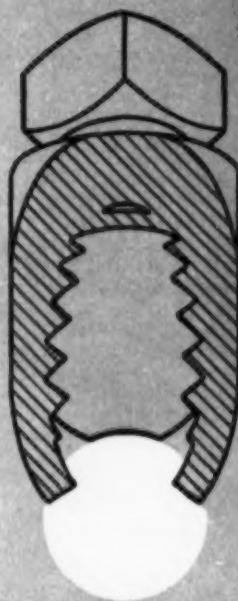
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Build long life into your overhead system with O-B Smooth Underrun Trolley Materials!

Every O-B Smooth Underrun fitting holds formed wire without encircling it. Contour of every O-B Smooth Underrun fitting blends into the contour of the wire. Thus there are no bumps or jogs in the trolley wire—either along the underrun or on the sides of the wire at any wire-holding point.

Wire life depends greatly on the performance of current collectors. When they bounce, arcing and burning pits the trolley wire. Pits and lumps on the wire surface promote wear; decrease service life of the wire. O-B Smooth Underrun Trolley materials prevent this wear by preventing the cause — *they do away with bumps in the current collector path.*

Bump-free, arc-free trolley wire lasts a long time. Build this long life into your overhead system with O-B Smooth Underrun Trolley Materials!



Cross section of O-B Bulldog Trolley Wire Splicer shows how this (and all other) Smooth Underrun fitting blends into contour of wire.

O-B Bulldog Splicers join wire ends without making a jog in the current collector path.



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## NEWS BRIEFS . . From p. 140

cash for all anthracite coal in the yards of dealers throughout the United States and Canada. For each \$1,000 received by the dealer he will buy \$1,000 worth of Old Company's Lehigh. The new idea in merchandising, called the "Cash and Storage Program," is designed to aid all retailers, whether they are Lehigh Navigation customers or not, and the company expects to secure a large number of new customers as a result. Under the new plan, which the company calls a financial package that will provide dealers with ready cash for improving their yards, trucks and other equipment, Lehigh Navigation will purchase the dealer's good-quality coal inventories at current wholesale prices, regardless of brand. It will then sell to the dealer the same coal under its "Pay When You Sell Plan," plus an amount of Old Company's Lehigh equal to the cash payment. Its "Mine Storage Plan" assures the dealer of price protection until March 31, 1953. "Mine-storage" coal will be held at no charge until March 31, with shipments as the dealer directs, and the dealer will not have to pay for the coal until it is sold to the consumer.

### Bituminous Coal Institute Releases 1952 Annual

Copies of the 1952 edition of its *Bituminous Coal Annual*, the fifth in a series, were being distributed last month by the Bituminous Coal Institute, public relations department of National Coal Association. In words, figures, pictures, and graphics, according to Ralph C. Mulligan, BCI's director of public relations, the new 176-p volume "records the further progress of the industry in terms of improved efficiency and safety in mining, betterments in coal utilization, new uses and ever-widening markets, and the bright horizon for coal in the years ahead." Some of the basic data contained in previous annuals, to which has been added the most recent available figures, is found in the '52 book, along with much new statistical material. A series of stories about the states which are "richly endowed with coal" is introduced as a new feature of the 1952 annual. BCI is mailing copies to executives of NCA member companies, industrialists having an interest in bituminous coal as the basic fuel of their operations, government and private-industry economists and statisticians, newspaper and magazine editors and writers, radio and television commentators, press associations, libraries, and colleges and universities which teach mining engineering.

### And For Your Information . . .

Section foreman Thomas Walker, who retired Oct. 31 from the Melcroft mine of the EC&FA Coal Div. marked up a record of 55 yr of mining experience without suffering a lost-time accident. Mr. Walker, who started in the mines at the age of 11, had served 17 yr with the company as a section foreman. At the EC&FA Eccles No. 6 mine, Chris Hinte,

section foreman, and his same crew have now passed their fifth year together, working a total of 66,792 man-hours. The crew's record is unusual, also, because each individual member has long years of working without a lost-time accident.

A Virginia state commission, which will make an intensive study of the means to improve safety conditions in the state's coal mines, held its organizational meeting Dec. 2. The commission was voted last year after defeat of a proposed new mining code. Sen. George M. Warren, of Bristol, was elected chairman of the group, which is expected to survey interested groups and hold public hearings.

Four men died Dec. 13 as a result of a fire in the Elkhorn No. 3 mine of the Kentucky Div. of the Pond Creek Poca-hontas Co., thought to have been caused by a short circuit in a trolley wire. The four men, the only ones in the mine at the time, were trapped between the face and the origin of the fire, 2,500 ft underground.

Steel production during 1952 was expected to top 93 million tons, in spite of a loss of some 20 million tons because of the strike, it was reported Dec. 21. Operations during the third week of December were running at 106% capacity.

Lagging coal production was making heads roll in several Iron Curtain areas, according to reports last month. In East Germany, it was announced Dec. 10 that several key officials in one of the important coal mining districts had been arrested for sabotaging the country's coal production. The decline in coal output had been going on "month after month," with pit fires and other mine accidents almost daily, the report said. In Czechoslovakia, Premier Gottwald said Dec. 16 that it would be difficult to fulfill the country's 5-yr plan because of coal shortages. In one area, it was reported that when a week of extra effort was called for, Czech coal miners produced less coal than normal, not more.

### COMING EVENTS

AIME: annual meeting, Feb. 16-19, Hotel Statler, Los Angeles.

Eleventh Annual Anthracite Conference: May 7-8, Lehigh University, Bethlehem, Pa.

American Mining Congress: Coal Convention and Exposition, May 11-14, Cleveland, Ohio.

### Coal Committees Report At AMC Division Meeting

Over 225 representatives of coal mining companies and equipment manufacturers were present for the annual conference of the Coal Div., American Mining Congress, held Nov. 20 at the William Penn Hotel, Pittsburgh. With

Glenn Southward, AMC, presiding, each of the two sessions consisted of preliminary reports of the various continuing committees studying mine problems, supplemented by discussion from the floor.

### MORNING SESSION

"Methods of Roof Support for Conventional and Continuous Mining" was presented by W. D. Hawley. L. A. Panek reported on "Roof Bolt Testing," F. G. Smith is chairman of the committee on roof action.

Discussions on conveyor mining were led by A. E. Long, chairman, committee on conveyor mining. J. R. Fletcher outlined "Methods of Belt Loading," R. W. Storey reported on "Man Trips and Supply Delivery," and S. T. Allbrook discussed "Belt Fire Prevention."

Preliminary reports of the subcommittees on haulage roads included "Heavy Rail Turnouts," J. B. Haskell; "Enforcement of Block Signals," E. C. Brown; "Mine Car and Capacities," E. T. Lang and D. A. Zegeer; "Automatic Emergency Braking on a Locomotive That Violates a Stop Signal," A. R. Anderson; and "Factors Influencing Selection of 7-Ton-Capacity Mine Car For 28-In. Coal," R. D. Flowers. A. E. Belton is chairman of the committee on haulage roads.

Discussions on ventilation and dust problems were led by Stephen Krickovic, chairman, committee on ventilation. W. D. Northover presented the report on "Sources and Prevention of Airborne Dust" and W. D. Meakin reported on "Sealing and Ventilating Mined Areas."

### LUNCHEON MEETING

Dr. L. E. Young presided at the luncheon meeting held in the ballroom. C. F. Prideaux, Illuminating Engineering Society, spoke on "Better Mine Lighting," and Henry Hebley, research consultant, discussed "Prevention of Stream Pollution."

### AFTERNOON SESSION

T. W. Guy, chairman, committee on surface preparation, led discussions on subcommittee reports. D. H. Dowlin presented the subcommittee report on "Preparation Problems of Full Seam Mining," F. P. Calhoun presented his subcommittee report on "Preparation Problems of Continuous Mining," and T. W. Guy, substituting for R. A. Jimenez, reported on "Freeze Prevention."

E. Johnson substituted for J. J. Snure as chairman of the committee on mechanical loading. The subcommittee report on "Shuttle-Car Roadways" was presented by W. E. Hess. J. A. Younkens reported on "Roof Support for Continuous Mining," and F. R. Zachar discussed "Service Haulage for Continuous Mining."

C. R. Huffman served as chairman of the committee on underground power and led discussions of the subcommittee reports. T. R. Weichel reported on "High Voltage Cables," C. C. Conway delivered the subcommittee report on "Reversed Polarity," F. R. Hugus submitted the report on "Standardization of Mining Machine Motors Identification," and G. W. Acocck discussed "Cable Insulation."



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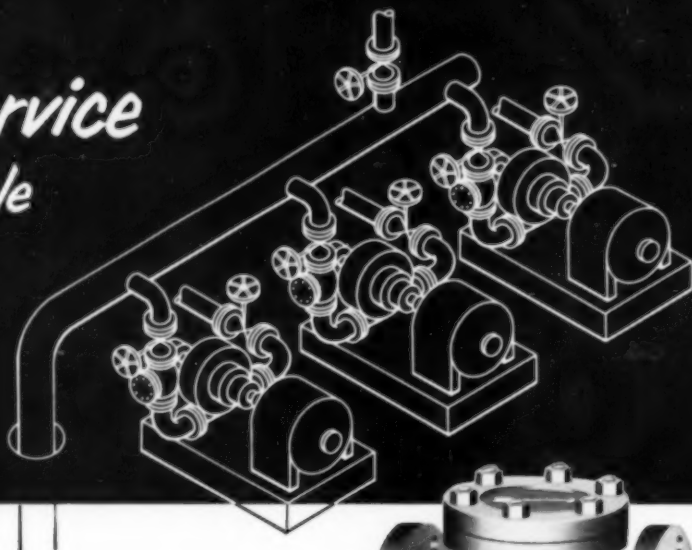
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*on Water Service  
for example*

(A Case History)



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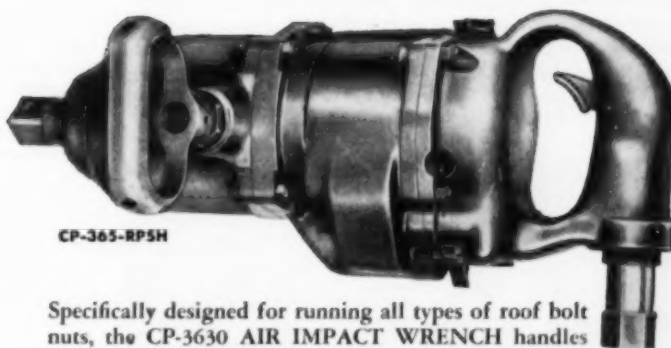
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**MINING METHODS**—W. A. Haley (left), mining engineer, USBM; Stephen Krickovic, chief engineer, Eastern Gas & Fuel Associates; D. J. Keenan, general supt., Sterling Coal Co., retiring institute president; and H. P. Greenwald, regional director, USBM, institute president-elect.



**ROOF CONTROL**—W. W. Dartnell (left), superintendent, Hillman Coal & Coke Co.; Selden Pearce, chemist, USBM; J. S. Schrecengost, chief engineer, Allegheny River Mining Co.; and Michael J. Garnek, mine inspector, bituminous division, Pa. Department of Mines.



**CLEAN STREAMS, TRAINING**—W. G. Stevenson, general manager, Hillman Coal & Coke; C. H. Maize, mine inspector, Pa. Dept. of Mines; R. B. Hewes, supervisory training, Mineral Industries Extension, Penn. State College; S. A. Braley, senior fellow, Mellon Institute of Research; and L. S. Morgan, division engineer, Pa. Dept. of Health.

Coal's technical problems and public responsibility major themes of . . .

## Coal Mining Institute

Roof control, training, stream pollution and mining methods come in for attention at the 66th meeting of one of America's oldest institutes.

A REPORT OF SUCCESSFUL modified longwall mining with a coal plow, a review of the economic and safety aspects of controlling roof through the use of masonry arches, roof-coating compounds and suspension bolts, an evaluation of supervisory training objectives and how they may be achieved and a panel presentation on the subject of stream pollution from mine refuse were features of the technical sessions of the 66th annual meeting of the Coal Mining Institute of America at Pittsburgh, Pa., December 11-12. At the annual banquet on Thursday evening, Tom Pickett, executive vice president, National Coal Association, Washington, D. C., delivered the major address on the subject, "Coal, Competition and Congress."

• "Let's look the coal industry squarely in the face," Mr. Pickett said, in setting the tone for his review of where the industry stands and where it is headed. Pointing out that the industry is highly competitive within itself and that it faces tough competitive battles with rival fuels, Mr. Pickett declared that a strong coal industry is necessary in the public interest and should be a matter of governmental concern. To that end, attention should be directed to conservation of the nation's natural gas resources, and as part of the conservation program, the burning of natural gas for inferior purposes should be restricted.

"An enlightened Federal Power Commission can well afford to take the steps necessary to preserve both the gas and coal industries before it is too late," Mr. Pickett added. On coal's present troubles, Mr. Pickett pointed out that even though some spokesmen envisage production of a billion tons annually 25 yr hence, producers can't balance today's budgets nor solve today's problems on that anticipated production. As a case in point, coal for railroad fuel is not expected to exceed 33 million tons for 1952 while this outlet provided a market for 109 million tons only 5 yr ago in 1947.

On the matter of relations with the government, Mr. Pickett noted that there may be less supervision, interference and control from the new administration, but a rapid and entire relinquishment of government regulation cannot be expected. As a matter of fact, the new Congress will include only two senators who have served in a Republican administration and both are Democrats. In the House, 22 members have served during a Republican administration, 11 from each of the major parties. Furthermore, many thousands of so-called "little people" in government, who have much to do with policy making, will remain and perhaps have some influence. Therefore, coal will have to promote its interests before Congress and administrative agencies with the same vigor as heretofore.

D. J. Keenan, general superintendent, Sterling Coal Co., Elmore, Pa., and retiring president of the institute, was chairman, and M. D. Cooper, director, mining engineering education, National Coal Association, Pittsburgh, Pa., was toastmaster.

Officers elected for the coming year at the Thursday morning business session are: president—H. P. Greenwald, regional director, Region VIII, U. S. Bureau of Mines, Pittsburgh, Pa.; vice presidents—J. J. Snure, production manager, Rochester & Pitts-

### INDUSTRY MEETING—A Special COAL AGE Staff-Written Report



burgh Coal Co., Indiana, Pa.; W. G. Stevenson, general manager of mines, Hillman Coal & Coke Co., Pittsburgh; and T. G. Ferguson, vice president, Pittsburgh Coal Co., Library, Pa.; secretary-treasurer—J. M. Lowe, chief clerk, Hillman Coal & Coke Co., Pittsburgh.

• In his president's address following the business session, Mr. Keenan pointed out that while coal basically is favored in the fuel picture, high costs and competition are a source of present headaches with no one knowing what stresses and strains lie in the future. To offset these strains, efficiency must be raised from a foundation of stepped-up planning. Increased safety is vital and tons per man day must be increased by constant emphasis on new and improved machines and better mine layouts to better utilize available working time. Furthermore, above-board collective bargaining at all levels is essential if all in the industry are to benefit.

Noting that coal property represents a 5-billion-dollar investment, Mr. Keenan declared that such an investment must be protected by a moderate return. And on research, Mr. Keenan advocated increased activity to permit coal to capitalize on its bright future as a raw material from which synthetic liquid fuels and chemicals can be made and also as a fuel in more efficient burners.

#### MODIFIED LONGWALL MINING

• Leading off the technical presentations, W. A. Haley, mining engineer, USBM, Pittsburgh, described successful experiments in West Virginia with the Loebbe Hobel coal planer, a German unit which contributed to higher percentage recovery and more tons per man day from the Pocahontas No. 4 seam. The planer consists of an armored conveyor, drive units at each end, a control station at the discharge end, the planer head and its tow chains, and 17 pneumatic shifters which move the conveyor toward the face as successive slices of coal are removed.

In reporting the performance of the

unit in the tests, Mr. Haley said that recovery was 83.3%, productivity was 17.1 tons per man day and delays resulting from mechanical troubles were negligible. The planer has retreated two panels and now is working in the third. Panels are 328 ft wide; the first was retreated 1,441 ft and the second 892 ft. A full description of operations in the first panel appears in *Coal Age*, November, 1952.

In discussing Mr. Haley's paper, Stephen Krickovic, chief engineer, Coal Div., Eastern Gas & Fuel Associates, Pittsburgh, Pa., presented test conclusions as follows:

1. A major roof break to the surface is not necessary in this method of mining if sufficient fill-in material is available above the seam. The swell of this broken material is sufficient to fill the void to form support for the major roof.

2. Fireclay may lead to difficulty in controlling the roof. If water collects, the steel props have a tendency to sink into the bottom, thus making recovery of the props difficult and fouling up the regular action of the roof. Timber cribs were found to be useful in alleviating some of these difficulties.

3. In any event, if water is present in an area underlain by fireclay, plan the workings to retreat up the pitch to permit the water to drain into the gob area and not toward the face.

4. With longwall mining, a change in attitudes is necessary. The conditions appear to be precarious but most of that is because American coal men are unfamiliar with the methods.

The planer operates about 64% of the available shift time, Mr. Krickovic reported, and throughout the work the face never was lost in spite of lay-offs of 10 and 15 days duration.

#### MASONRY ARCHES, ROOF COATINGS

At the Thursday afternoon session, papers relating to the control of mine roof with masonry arches and roof coatings



were presented by W. W. Dartnell, superintendent, Gibson mine, Hillman Coal & Coke Co., Bentleyville, Pa.; M. J. Garnek, mine inspector, bituminous division, Pennsylvania Department of Mines, Canonsburg, Pa.; L. B. Berger, chief, health branch, USBM, Pittsburgh; and J. S. Schrecengost, chief engineer, Allegheny River Mining Co., Kittanning, Pa. Mr. Berger's paper was presented by Selden Pearce, chemist, health branch, USBM, Pittsburgh. Mr. Greenwald, president-elect, was session chairman.

• Faced with the problem of finding better methods of supporting high places in main haulageways, Hillman officials have adopted the masonry arch as the best solution under the conditions prevailing at Gibson, Mr. Dartnell reported. The arch was selected because it requires a minimum of fill-in material or lagging, and investigation into the possibility of using roof bolts showed that too many bolts would be required to hold the soft sidewall material above the seam and the

(Continued on p 176)



**ROOF-BOLTING**—J. J. Snure (left), production manager, Rochester & Pittsburgh Coal Co.; G. J. Steinheiser and H. E. Shomper, mine inspectors, Pennsylvania Department of Mines; J. P. Harmon, mining engineer, United States Bureau of Mines; and D. C. Ridenour, chief engineer, Olga Coal Co.



**NCA OFFICIALS**—M. D. Cooper (left), director, mining engineering education; L. C. Campbell, vice president, EGFA, and president, NCA; and Tom Pickett, executive vice president, NCA, speaker at the banquet.

# New Mine Developments

## Ayrshire to Open Large Strip To Supply Ohio AEC Plant

The Ayrshire Collieries Corp., Indianapolis, announced last month that it planned development of new mine in Warrick County, Indiana, on the Ohio River, from which it expected to supply at least half of its recently announced contract with the Ohio Valley Electric Corp. The mine will be a completely mechanized surface operation capable of producing some 900,000 tons of Indiana No. 5 coal a year. Operating details are currently being developed. Ayrshire is one of five coal companies which recently accepted contracts to supply more than 7 million tons annually to the two power plants Ohio Valley Electric will build to power the atomic energy facility to be constructed in Pike County, Ohio (*Coal Age*, December, p 128). It is scheduled to deliver 1,780,000 tons annually to the plant planned at Madison, Ind. Coal shipments are not scheduled until late in 1954.

## Turkey Gap Coal & Coke Acquired by Crozer

The Crozer Coal & Land Co., Philadelphia, announced at the end of November the acquisition of the Turkey Gap Coal & Coke Co., operating mines at Dott, W. Va. The company will become a division of the Crozer organization, with James A. McQuail, Turkey Gap president and operator of the property for some 40 yr, remaining as general manager of mines at Dott. The operation mines the Pocahontas No. 3 seam and produced 411,315 tons in 1951.

## Construction Starts on New Peabody Mine

Shaft sinking at the new Peabody Coal Co. Mine No. 11, near Taylorville, Ill., was scheduled to begin Jan. 1. Stuyvesant Peabody, president, announced Dec. 9. The Dravo Corp., Pittsburgh, which has been awarded a contract for the work, reportedly was moving equipment to the site and completing preparatory work last month. The hoisting shaft is scheduled to be completed by Dec. 1, 1953, and a materials shaft about a month later. Tracks into the property recently were completed by the Wabash R. R. and the company has installed a supply track, with roadways, drainage and water lines currently underway.

## And For Your Information . . .

The South-East Coal Co., Seco, Ky., recently began production from its new mine at the mouth of Goose Creek, near Neon, Ky. The property is expected to have a capacity of more than 3,000 tpd, with coal prepared in a new modern cleaning plant. According to reports, the company's Seco mine has been worked out and is being discontinued.

Purchase by Lehigh Coal & Navigation Co. of certain assets of Weston Dodson & Co., Inc., in exchange for 273,000

shares of Lehigh's common stock was completed Dec. 1, according to an announcement by Robert V. White, Lehigh president. The transaction, which had been expected to take place before the end of the year (*Coal Age*, December, p 128), is a mutually beneficial arrangement, Mr. White said. "Weston Dodson customers will have an assured supply of anthracite in the future," he pointed out. "We estimate that this transaction should materially increase the production and sale of coal from our properties. The additional production should result in steadier working time at the mines, lower idle plant expense and greatly increase earnings."

The Blair-Oldham Coal Co., Whitesburg, Ky., has changed its name to the Emmett Blair Coal Co., headed by Emmett Blair, with the departure of John C. Oldham, former partner, from the company. The new organization plans further development of properties on Daniel Fork of Rockhouse Creek, with a daily output of 2,000 to 3,000 tons. It expects to obtain a short spur from the Rockhouse branch of the L&N, to eliminate a 7-mi truck haul.

## New Books for Coal Men

### Using Oil Again

**The Case for Re-Refined Oil**, by M. Belmont ver Standig. Here's the picture of a growing industry that's doing a service of conservation by taking used lubricating oil and making it over for further use. This book tells how the oil is re-refined, what the characteristics of re-refined oil are, who uses it and where the re-refining plants are located. 87 pp. 8x11-in; paper; mimeo. Price not quoted.

COAL AGE was founded in 1911 by the Hill Publishing Co. In 1915 COLLIERY ENGINEER, with which MINES AND MINERALS previously had been consolidated, was absorbed by COAL AGE.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., Inc., COAL AGE became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During 42 years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Lasher, John M. Carmody, Sydney A. Hale and Ivan A. Given. The editorial staff of COAL AGE presently consists of: Ivan A. Given, J. H. Edwards, William H. McNeal, W. A. Stanbury Jr., Harold Davis and A. E. Flowers.

Association of Petroleum Re-Refiners, 1917 Eye St., NW, Washington, D. C.

## Other Books and Booklets

**Two Methods of Artificial Respiration: A Teaching Manual.** 12 pages of pictures making up a safetygraph. 18x24-in. Price not quoted. National Safety Council, 435 N. Michigan Ave., Chicago 11, Ill.

**American Standard Safety Code for Installing and Using Electrical Equipment in and About Coal Mines (M2.1).** USBM, Bulletin 514. 20¢. Supt. of Documents, Government Printing Office, Washington 25, D. C.

**Coal Reserves of Virginia.** A. Brown, H. L. Berryhill, D. A. Taylor and J. V. A. Trumbull. USGS, Circular 171. Free. Chief of Distribution, Geological Survey, Washington 25, D. C.

**Preparation Characteristics of Coal From Floyd County, Ky.** by W. L. Crentz and J. W. Miller. USBM, R. I. 4920. 21 pp 8x10½-in; paper; mimeo. Free. Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

## Preparation Facilities

**Pocahontas Fuel Co., Inc., Mine No. 31, Amonate, Va.**—Contract closed with Fairmont Machinery Co. for fine-coal cleaning and drying addition to existing plant, including Deister Concentrator tables cleaning 290 tph of ¾x0; primary drying with Bird machines; and final thermal-drying in Link-Belt Multi-Louvre driers.

**Johnstown Coal & Coke Co., Logan No. 3 mine, Beaverdale, Pa.**—Contract closed with Roberts & Schaefer Co. for complete dry-cleaning plant, including R&S Super-Airflow pneumatic coal cleaners; capacity, 100 tph of ¾x0.

**Imperial Coal Corp., Cambria Mine, Coalport, Pa.**—Contract closed with Roberts & Schaefer Co. for complete dry-cleaning plant, including R&S Super-Airflow pneumatic coal cleaners; capacity, 50 tph of ¾x0.

**United Electric Coal Cos., Chicago**—Contract closed with Roberts & Schaefer Co. for one 6-ft-diameter Hydrotator process unit; capacity, 60 tph of ¾x0.

**Ebensburg Coal Co., Colver mine, Colver, Pa.**—Contract closed with Roberts & Schaefer Co. for complete dry-cleaning plant, including R&S Super-Airflow pneumatic coal cleaners; capacity, 140 tph of ¾x0.

**Valley Camp Coal Co., Alexander mine, Elm Grove, W. Va.**—Contract closed with Jeffrey Mfg. Co. (by E. P. Dandridge Co.) for dewatering equipment; capacity, 10 tph, ¾x0.

**Page Coal & Coke Co., Pageton, W. Va.**—Contract closed with Jeffrey Mfg. Co. for 4-compartment mixing conveyor; capacity, 232 tph of 6x¾; and dewatering equipment, capacity, 120 tph, ¾x¾.

**Sycamore Coal Co., Cinderella, W. Va.**—Contract closed with Jeffrey Mfg. Co.



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In the catalog of Wilmot Rivetless chain conveyors and elevators you will find by far the largest listing of attachments available -- in malleable iron, drop-forged steel and cast carbon or alloy steels. As the originators of Rivetless chain, Wilmot also offers the largest choice of chain sizes, and conveyor and elevator parts from drive to take-up. Chain in pitches from 3" to 10½" and working loads from 3,000 to 130,000 lbs., of drop-forged steel, alloy or cast chrome-manganese. Because of our larger choice of conveyor parts, an increasing number of firms depend on Wilmot for replacements.

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for washery with Jeffrey Baum jig; capacity, 200 tph of 7x0.

**Alabama Power Co., Barry Steam Plant, Mobile, Ala.**—Contract closed with Haworth Engineering & Mfg. Co. for complete coal-handling system consisting of design, construction and installation of feeders, weighing devices, crusher and sampling systems, etc.; capacity, 850 tph, to feed two generating units presently scheduled for construction. Prepared coal delivered by railroad or river barges will be placed in storage through a series of five conveyor belts or go directly to generating plant via those five belts through the crusher building and six additional belts.

**Stonaga Coke & Coal Co., Appalachia, Va.**—Shipment by Deister Concentrator Co. of four SuperDuty Diagonal-Deck No. 7 coal washing tables.

**Lynnville Coal Co., Buckskin, Ind.**—Shipment by Deister Concentrator Co. of four Conenco revolving feed distributors, feeding 15 SuperDuty Diagonal-Deck coal washing tables previously shipped.

**United States Steel Co., Robena slope, Poland, Greene County, Pa.**—Shipment by Deister Concentrator Co. of five Conenco revolving feed distributors.

**Mathies Coal Co., Mathies mine, Courtney, Pa.**—Shipment by Deister Concentrator Co. of 12 SuperDuty Diagonal-Deck No. 7 coal washing tables, making a total of 26, for cleaning ¼x0 coal.

**Swatara Coal Co., Minersville, Pa.**—Contract closed with Western Machinery Co. for Wemco Mobil-Mill with 2-compartment drum separator for cleaning 100 tph of run-of-mine or bank material in sizes from buckwheat to egg.

**Rochester & Pittsburgh Coal Co., Ernest Mine, Ernest, Pa.**—Contract closed with McNally Pittsburgh Mfg. Co. for fine-coal preparation and thermal-drying plant addition to existing plant for washing 50 tph of ½x0 on four Deister coal-washing tables, complete with water handling, cyclonic thickening and filtration plant for washed ½x0; dewatered and filtered washed coal to be dried in one McNally Pulso fine-coal drier.

R. Tyson, Roebling president. After the purchase, scheduled to take place Dec. 31 subject to completion of the details, the Roebling business will be operated as a subsidiary of CF&I under the Roebling name. Mr. Tyson, president since 1944, will continue to direct the operations of the Roebling plants. The company was founded in 1841 by John A. Roebling, builder of the Brooklyn Bridge. Consolidated sales volume of the two companies is expected to approach \$300 million, according to Alwin F. Franz, CF&I president.

Five major changes in the top management of United States Steel were made at a meeting of the board of directors in New York Nov. 26, it was announced by Benjamin F. Fairless, chairman of the board and president of the corporation.

Clifford F. Hood, a former Illinois farm boy, was elected president of the corporation effective Jan. 1, and a member of the board of directors effective immediately. Mr. Fairless will continue as chairman of the board and chief executive officer. Robert C. Tyson was elected vice chairman of the finance committee and a member of the board of directors and will also continue as vice president and comptroller.

Harvey B. Jordan was elected executive vice president—operations, succeeding Mr. Hood. Walter F. Munford, formerly vice president in charge of operations of the American Steel & Wire Div. of U. S. Steel, was appointed president of that division, to replace Mr. Jordan. Howard E. Isham was elected vice president and treasurer of the corporation succeeding Max D. Howell, who has retired. As previously announced, United States Steel Co. will be merged into the United States Steel Corp., effective at

## Among the Manufacturers

The Jeffrey Mfg. Co., Columbus, Ohio, last month announced consolidation of its Coal Preparation and Ore Beneficiation sales divisions into a new Materials Beneficiation Div., with William H. Newton, formerly manager of ore beneficiation, as manager of sales. Harold C. Medley, formerly manager of coal preparation, has been placed in charge of research and development for all the

Conveyor Div., reporting to James A. Flint, vice president in charge of engineering.

Plans for the purchase of the John A. Roebling's Sons Co., Trenton, N. J., by a wholly owned subsidiary of the Colorado Fuel & Iron Corp., were announced last month by Charles Allen Jr., chairman of the board of CF&I, and Charles



### Link-Belt Completes 17th Plant

MANUFACTURE of custom-designed conveying and processing machinery for scientific, economical handling of materials has been put on a straight-line production basis in this new 300,000-sq ft plant at Colmar, Pa., formally opened last month by Link-Belt Co., Chicago. The plant, which is the company's 17th, has an over-all length of 880 ft and is equipped with overhead bridge cranes in four of the five 60-ft production bays. It is designed to permit expansion to double the present manufacturing area. Engineering activities occupy the entire second floor of the office in front.



### Air Reduction Opens New Plant

A NEW CENTER for manufacturing welding and cutting equipment, this modern plant of the Airco Equipment Mfg. Div., Air Reduction Co., at Union, N. J., was officially opened Nov. 17. The new facility, employing approximately 1,000 persons, is a brick and steel plant covering about 272,000 sq ft on a 25-acre plot. The more than 12,000 different items produced by the division are sold domestically by various other Air Reduction divisions; in Canada by Air Reduction, Canada, Ltd.; in Cuba by Cuban Air Products Corp., and internationally through Airco Co., International.



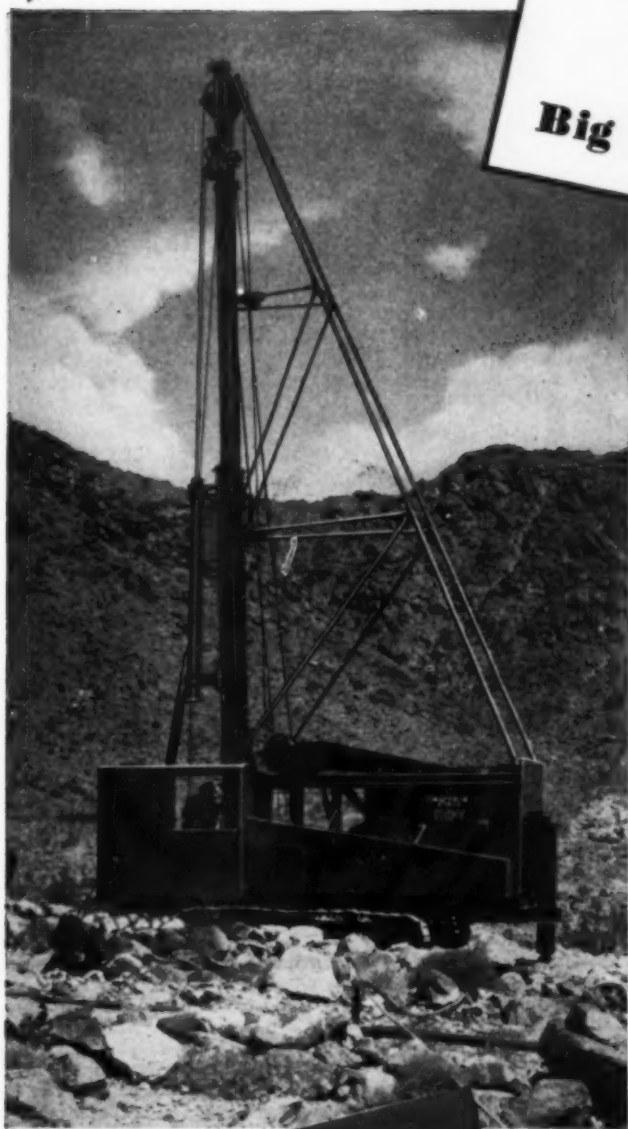
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**Handles 6,000 lbs. of tools  
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**H**ERE'S the largest capacity, mobile churn-type blast hole drill on the market today. It's the new Bucyrus-Erie 50-T, successor to the well-known 42-T used and preferred by mining companies the world over for the past 16 years. The new 50-T gives you all of the popular advantages of its predecessor plus many improvements based on Bucyrus-Erie's unequalled experience in manufacturing blast hole drills. Some features that make the 50-T stand out are:

**NEW TUBULAR TYPE TOOL GUIDE** steadies and guides the tools when a new hole is started, enabling the operator to run drill at maximum speed from the very start of the drilling operation. Guide opening and closing is hydraulically controlled.

**HYDRAULIC LEVELING JACKS**, two at the drilling end and one at the power unit end, make leveling fast and easy. Jacks are 5½ inches in diameter and have a 36-in. maximum travel. Jack supports are an integral part of the drill frame.

**NEW HEAVIER DERRICK MEMBERS** to give you all the derrick strength needed to meet toughest drilling conditions. Lower section has 10-in., 15.3 lb. channels; upper section 9-in., 13.4 lb. channels.

**POWER DRIVEN TOOL WRENCH**, built into the operator's platform, makes easy work of setting up or loosening tool joints. Proper pressure for tightening up tool joints is determined by means of a hydraulic torque indicator.

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# THE VICTAULIC® METHOD OF PIPING



## EASIEST WAY TO MAKE ENDS MEET



**VICTAULIC**  
COMPANY OF AMERICA  
P. O. Box 509 • Elizabeth, N. J.  
Office and Plant: 1100 Morris Ave.  
Union, N. J.  
Telephone: Elizabeth 4-2141

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TEES . . . ELBOWS . . . REDUCERS . . .  
the Victaulic Method features a complete line of  
modern, top efficiency, Full-Flow Fittings for  
use with world famous Victaulic Couplings!

The Victaulic Method assures a complete,  
modern system of piping . . . fast, efficient  
hook-ups that simplify and streamline  
construction . . . cut costs! Victaulic Couplings  
offer easy-to-install, leak-proof connections . . .  
a union at every joint . . . assured trouble-free  
service under pressure or vacuum. Victaulic  
Full-Flow Fittings specially designed for use  
with Victaulic Couplings provide wide  
adaptability and complete versatility in  
construction. And to make the Victaulic Method  
complete—"Vic-Groover" Tools groove standard  
pipe easily and quickly . . . provide handy,  
portable equipment for preparing pipe right  
on the job!

Try the VICTAULIC METHOD on your next  
piping job. New construction . . . repairs . . .  
alterations—you'll find that the Victaulic Method  
is the easiest way to make ends meet!

Write today for Victaulic Catalog and  
Engineering Manual No. 44-8-A.

### 28th VICTAULIC YEAR

California: Victaulic Inc., 2330 East 8th Street, Los Angeles 21

Canada: Victaulic Co. of Canada Ltd., 406 Hopewell Ave., Toronto 10

Export: Pipe Couplings, Inc., 30 Rockefeller Plaza, N. Y. 20, N. Y.

### EQUIPMENT APPROVALS

Eight approvals of permissible  
equipment were issued by the U. S.  
Bureau of Mines in November, as  
follows:

Lee-Norse Co.—Model CM-50 Min-  
er; one 5-hp, one 15-hp and two 60-  
hp motors, 250 v, DC; Approval 2-881;  
Nov. 3.

Joy Mfg. Co.—Type 18HR-2H/  
HY/KK/N/NN/V loading machine;  
one 4-hp, two 7½-hp and one 75-hp  
motors, 380, 400, 440, 500 and 550 v,  
AC; Approval 2-882A; Nov. 7.

Joy Mfg. Co.—Type 6SC7PE/PXE-1  
cable-reel shuttle car; three 7½-hp  
motors, 250 v, DC; Approval 2-883;  
Nov. 12.

Joy Mfg. Co.—Type RBD-10 and -15  
roof-bolting drills; one motor, 10 or  
15 hp, 220, 380, 440, 500 and 550 v,  
AC; Approvals 2-884 and 2-884A;  
Nov. 14.

Joy Mfg. Co.—Type 18HR-2H/HY  
loading machine; one 4-hp, two 7½-  
hp and one 75-hp motors, 380 and 440  
v, AC; Approval 2-885A; Nov. 20.

Joy Mfg. Co.—Type 42D23P/24P  
battery-operated shuttle car; three  
7½-hp motors, 90 v, DC; Approval  
2-886; Nov. 21.

Joy Mfg. Co.—Type 6SC4PE/PXE-2  
cable-reel shuttle car; three 7½-hp  
motors, 250 v, DC; Approval 2-887;  
Nov. 26.

Stewart R. Browne Mfg. Co., Inc.—  
Models F-91-X and F-81-X flashlights;  
Approval 606-A; Nov. 21.

the beginning of 1953, when the parent  
company will become primarily an oper-  
ating company.

Harry C. Davis, general manager,  
Kanawha Mfg. Co., Charleston, W. Va.,  
has been elected president of the Con-  
veyor Equipment Manufacturers' Asso-  
ciation, succeeding G. Walter Ostrand,  
general manager, Caldwell Plant, Link-  
Belt Co., Chicago. R. C. Sollenberger,  
for many years the staff head of the  
organization, was re-elected executive  
vice president. Mr. Davis has been presi-  
dent of the Charleston Chamber of Com-  
merce, a director of the National Associ-  
ation of Manufacturers and currently is a  
vice president of the West Virginia Man-  
ufacturers' Association. He has been as-  
sociated with the Kanawha Mfg. Co.  
since 1924. Other new officers are: R. F.  
Tomlinson, general sales manager, The  
Oliver Corp., A. B. Farquhar Div., vice  
president; Jervis C. Webb, executive  
vice president and general manager,  
Jervis B. Webb Co., treasurer; and Fred  
S. Wells, vice president, Stephens-Adam-  
son Mfg. Co., secretary. Elected as di-  
rectors were: J. A. Jeffrey, vice president,  
Jeffrey Mfg. Co.; Lee Sekulski, sales  
manager, Mathews Conveyor Co.; and  
R. B. Maas, president, Screw Conveyor  
Corp.



Tough, flexible Hazacord® Twin Type G. Note the mold-cured Hazaprene ZBF Sheath that forms a flame-resistant barrier between the power and grounding conductors and prevents short-circuiting.

In the rough and tough mining industry, it takes real men to operate the heavy-duty equipment . . . and rugged cable to keep it on the job.

Engineered throughout for this tough service, Hazacord® Twin mining cable has the stamina to stand up under the many punishing conditions of underground work. The tough Hazaprene ZBF Sheath — vulcanized under pressure in a metal mold — has the smooth finish, density, resistance to flame, moisture and abrasion required for safety and long life. The separately insulated conductors are each reinforced with a moisture-resistant, non-rotting open braid which locks conductors and sheath into one integral mass and prevents internal slip-

ping. Yet, with all this protection, Hazacord mining machine cable has the flexibility that adds years of extra life.

Hazacord mining machine cable is certified as flame resistant by the U. S. Bureau of Mines and the Pennsylvania Department of Mines—look for "P-104BM" molded into the sheath. For full information on the complete line of Hazacord portable cables and flexible cords used by the mining industry, write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.



**HAZACORD** *Mold-Cured* portable cables



# REMOVE TRAMP IRON

WITH *Stearns*  
SUSPENDED MAGNETS  
LOWEST COST WAY



## SAVES MONEY!

Here's the economical way to protect crushers, grinders, pulverizers and other vital equipment — use a STEARNS Suspended Magnet over your conveyor belt or head pulley. This STEARNS Circular Suspended Magnet is one of two installed at the National Gypsum plant at Savannah, Ga., to remove all tramp iron before the rock enters the crushers.

You can protect your machinery and purify your product the low cost, positive way. Eliminate all tramp iron with STEARNS Suspended Magnets — this means fewer repair bills on crushing equipment, fewer shutdowns and higher production.

Whether you are handling rock, slag, coal or ore, investigate STEARNS Suspended Magnets; they're easy to install and have low operating and maintenance costs. Write today for descriptive literature on both circular and rectangular suspended magnets.

Complete laboratory and testing facilities available for separation tests on your materials.



STEARNS Circular Suspended Magnet for inclined installation over head pulley.



Rectangular Suspended Magnets available in sizes and shapes to meet your requirements.



Foremost in the Magnetic Field  
*Stearns*  
**MAGNETIC INC.**

661 South 28th Street, Milwaukee 46, Wisconsin

Fairfield Engineering Co., Marion, Ohio, has appointed Wayne H. Kuhn to the newly created post of general sales manager. Named to replace Mr. Kuhn as sales manager of the contract division was W. R. Reichenstein, formerly chief engineer. Bruno Rybicki, who has assumed the duties of chief engineer, comes to Fairfield from U. S. Steel, where he had been chief design engineer for the Coal Div.

The Explosives Div. of the American Cyanamid Co. has been merged with the Calco Chemical Div. of that company. R. E. Wiley, formerly general manager of the Explosives Div., has become a consultant to the general manager on matters pertaining to the explosives department. G. C. Holton, who has been assistant general manager, has been made manager of the explosives department.

John E. Angst, sales agent for the American Car & Foundry Co. in Chicago, has been appointed assistant western sales manager. Mr. Angst, who will continue his headquarters in Chicago, was with Oglebay Norton & Co., Cleveland, in the sales department before entering the army in 1941. In 1945 he joined the ACF sales staff as a sales agent in the New York office and was transferred to Chicago in 1948.

American Hoist & Derrick Co., St. Paul, has announced that James F. Bishop, in addition to his corporate duties of secretary-treasurer, has been appointed general manager of the company. A veteran of 30 yr of service with American Hoist, Mr. Bishop has been secretary-treasurer since 1945 and a member of the board of directors since 1951.

Trabon Engineering Corp., Cleveland, has appointed J. G. Baldwin regional sales representative in Georgia, with headquarters in Atlanta. Mr. Baldwin has been in charge of the industrial lubrication departments of two major oil companies for the past 15 yr.

Firth Sterling, Inc., Pittsburgh, has named John S. Roller assistant general sales manager. He was formerly vice president and general manager of The Method X Co., a Firth Sterling affiliate devoted to the research and development of an electro-mechanical process of machining heretofore unmachinable materials. Prior to his association with the Firth Sterling organization, Mr. Roller was general manager of sales, Republic Supply Co., Houston, Texas. The appointment of Don P. Carr, sales representative, as assistant sales manager of the Steel Div. also has been announced by the company. Before coming to Firth Sterling in 1947, Mr. Carr had been associated with the Jessop Steel Co. and Crucible Steel Corp.

Wm. F. Huggins, president of Le Roi International and Le Roi Pan-American, has been appointed assistant to the president of Westinghouse Air Brake Co., Pittsburgh, with special assignments directly related to its European companies. E. O. Boshell, president of Westinghouse Air Brake, has announced. Mr. Huggins, who joined Le Roi as manager of foreign





**TEAMWORK PAYS OFF.** The gigantic walking dragline needs level ground to move on, and the Big Red TD-24 has the power and speed to level it and keep ahead. The TD-24 has the greatest working drawbar horsepower of any crawler on the market and other outstanding features that produce more work at less cost.

# Piling it Up for Pyramid

**INTERNATIONAL**

**POWER THAT PAYS**



## International power will pile it up for you

Pyramid Coal Corporation produces 6,500 tons of soft bituminous coal a day from a mine near Pinckneyville, Illinois. And two Big Red International TD-24 crawlers help do it.

*"There's a world of power in those TD-24s and they handle just the way an operator wants them to," says operator Ruby Presswood. "I've dozed chunks of dirt bigger than the tractor itself. One day I moved more dirt than two other big crawlers combined on the same job."*

You can put performance like this to work for you. See your International Industrial Distributor right away.

**INTERNATIONAL HARVESTER COMPANY,  
CHICAGO 1, ILLINOIS**

**WILLSON**  
plastic protective  
equipment

keep on  
the safe  
side



wear  
**WILLSON  
MONOGOGGLES®**

Workers wear Willson protective equipment willingly because these MonoGoggles® and other safety devices shown are lightweight and comfortable. MonoGoggles® illustrated above are available in flexible Polythene and fully transparent Acetate for extra side vision. Interchangeable lenses in clear plastic or Tru-Hue green. Ask for Willson—the leading line of respiratory and eye safety equipment for industry, farm and home use.

Choice of clear  
or green plastic  
lenses



**WILLSON  
PROTECTO-SHIELD®**

gives full face protection with a choice of 4", 6" and 8" visors. Ideal for many industrial operations. Also available with full flare at sides for extra protection against chemical splash.



Weights  
less than  
an ounce!

**WILLSON FEATHERSPEC®**

... specially designed for light-duty operations. Comfortably worn over prescription glasses. Their clear or Tru-Hue green plastic lenses can be switched in a few seconds.

See your Willson distributor or write for bulletin

**WILLSON PRODUCTS, INC.**

239 Washington St., Reading, Pennsylvania



## COAL MEN ON THE JOB . . .

**WEST VIRGINIA:** Frank Nida (left), day electrician; J. L. Dove, general mine foreman; and Carl Gillum, chief electrician, No. 2 mine, Gay Coal & Coke Co., Mt. Gay, Logan County, W. Va. F. A. Ritch (right photo), assistant general mine foreman, Stotesbury No. 8 mine, Coal Div., Eastern Gas & Fuel Associates, Stotesbury, W. Va.

sales in 1947, will continue to direct the activities of the two Le Roi subsidiaries engaged in foreign trade and will divide his time between Milwaukee and Pittsburgh. Frank Kuether, formerly assistant chief engineer, has been named executive engineer for the Le Roi Co., in Milwaukee. Mr. Kuether joined Le Roi in 1926 when it purchased the Beaver Motor Corp., where he had been employed as a draftsman.

Raymon Manson Eaton, superintendent and resident manager of the Hazard Insulated Wire Works Div. of The Okonite Co., Wilkes-Barre, Pa., retired Dec. 31, after nearly 45 yr of service with the company. He moved to Wilkes-Barre as superintendent and resident manager of the Hazard Insulated Wire Works Div. when it was purchased by Okonite late in 1927 and had served in that capacity since. He will be succeeded as resident manager by David W. Nurse, previously factory sales manager, who came to Wilkes-Barre from the company's sales office in Portland, Ore.

James Edgar (Colonel) Mereness, 69, consulting sales engineer for Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio, died Nov. 23 in St. Vincent's hospital, Indianapolis, after a 3-day illness while on a business trip. A pioneer in the power-shovel field, which he entered at the age of 19, the Colonel introduced steam earth-moving equipment in Mexico many years ago. He joined the Lima Locomotive Works in 1929 as district sales manager covering the Midwestern states. He was made consulting sales engineer in 1949.

Robert C. Nelson has been named advertising and sales promotion manager of Long Super Mine Car Co., Inc., Oak Hill, W. Va. A native of Chicago, Mr. Nelson brings to his present position wide experience in the coal-mining equipment field. For over 13 yr he was associated with the Goodman Mfg. Co.,

serving in various capacities in the advertising and sales departments.

Morse Chain Co., a Borg-Warner Industry, Detroit, has appointed C. H. Erbacher manager of its Detroit branch sales office. Mr. Erbacher, who formerly serviced Morse accounts in the Chicago area, will administer the sales of all Morse mechanical power transmission products in Michigan and northeastern Ohio.

Roberts & Schaefer Co., Chicago, opened new offices in Huntington, W. Va., Dec. 1, occupying Suite 303 in the Guaranty Bank Bldg. Richard G. Miller is district manager and Wm. W. Blood is sales engineer in the new office.

J. David Wright, a veteran of 43 yr in engineering electrical systems for industry, retired from the General Electric Co. Oct. 31. For the past 2 yr Mr. Wright had served as assistant manager of the G-E industry engineering and sales department. Mr. Wright joined G-E in 1909 following his graduation from the University of Wisconsin and had held varied posts in industrial engineering and sales divisions of the company. In the G-E control department at Schenectady, Frederic H. Holt has been named manager of marketing, and James W. Cooke, manager of engineering. With the company since 1935, Mr. Holt formerly was manager of sales-control devices. Mr. Cooke joined General Electric in 1925 and for the past year has been engineer of the manual and accessory control engineering section.

The Technical Writing Service of the McGraw-Hill Book Co., New York, has been enlarged to offer its publishing service to industrial and commercial firms and their advertising agencies for the production of a wide range of general and technical literature. Now staffed with more than 100 specialists—writers,

# ***NOW—*real" low type Storage Battery Locomotives**



**Low type RANGER**

Height—25" to 33" depending on battery capacity required.  
Weight—3T to 5T. Track Gauge—18" to 56½".



**Low type MONITOR**

Height—26" to 33" depending on battery capacity required.  
Weight—6T to 10T. Track Gauge—18" to 56½".

All Greensburg Storage Battery Locomotives are custom built to your individual requirements in single or double motor drives with drum or contactor type controllers. Because of their modern engineered design, our locomotives have, time after time—on job after job, proven themselves more efficient... given longer battery life and outperformed all other storage battery locomotives of equal weight and battery capacity.

**GREENSBURG MACHINE CO.**

102 STANTON ST., GREENSBURG, PA.

## **THURMAN PORTABLE TRUCK SCALE**

- Capacities 20, 25 & 30 Ton
- Platform Lengths 18, 22, 24 & 30 ft.



### **Wide Steel Bases**

at both ends support scale, therefore, require no concrete footing. Easy-to-read weigh-beam is chrome-plated. Other vital parts electro-plated against erosion.

### **The Thurman Line Includes:**

- Pit Scales up to 50-Ton capacity
- Pitless Scales • Batching Scales • Liquid Weighing Scales
- Wheelbarrow Scales • Warehouse Scales • This and other weighing equipment in sizes to fit your requirements

## **THIS SCALE CAN BE MOVED FROM JOB TO JOB, AS A UNIT**

### **Accurate and Portable**

This scale can be transported, assembled from one job to another by removing six bolts which hold the side levers in place. The assembled scale can be loaded onto a truck and lifted as a unit. Once positioned in the new location, it can be ready for use in minutes.

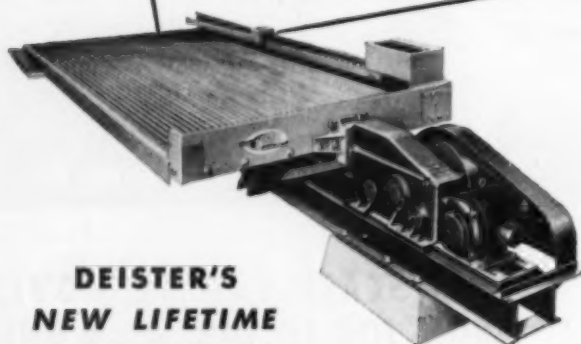
Also, can be installed as a pitless scale, saving expensive concrete pit-construction costs.

## **THURMAN MACHINE CO.** (Scale Division)

Established 1918

N. 5th Street, Corner of Lafayette, Columbus 15, Ohio





**Anti Friction Bearing Headmotion**—For longer life, reduced maintenance, less downtime; anti friction bearings reduce starting hp required.

**Wider Stroke Variation**—Offers greater number and variety of combinations of length of stroke in relation to speed of stroke for much greater efficiency.

**Easier to Service**—Upper housing is cast aluminum alloy, weighs one-fourth of previous unit housings; unit easier to service and adjust.

**Lower, More Streamlined**—New headmotion is lower and wider, mounting channels further apart for greater stability.

Eight new Deister Coal Washing Tables, with the new Deister Lifetime Headmotion, are setting new records for the profitable recovery of fines in the new modern streamlined tipple of Miners Coal Company's Fies Mine at Madisonville, Kentucky.

Pleased by new peak performance, Kenneth Snarr, General Manager says: "We feel there would be no other way of recovering the valuable fines so satisfactorily. We bought the eight new-type tables because of the excellent performance of Deister Tables installed in 1947 at our Williams Mine."

Get new efficiency—cleaner fines with minimum ash and sulphur. Investigate the *new Deister tables* with the *New Deister Lifetime Headmotion*. Call, write or wire today!



**DEISTER MACHINE COMPANY**  
FORT WAYNE 4, INDIANA

editors and artists of many technical and publishing backgrounds—TWS is equipped to take full responsibility for the preparation of specialized literature, from concept and analysis through research, writing, visualization, art and mechanicals to the delivery of bound copies. Types of literature TWS is set up to prepare include industrial and stockholder relations booklets, company histories, training manuals and aids, handbooks, product bulletins, parts lists and a great variety of technical, semi-technical and general publications.

**W. L. Voegli** has been named to fill the newly created position of assistant director of engineering, Tractor Div., Allis-Chalmers Mfg. Co., Milwaukee, and will assist A. W. Van Hercke, vice president and director of engineering. Mr. Voegli has been with the company since 1935 and formerly was agricultural tractor sales manager.

**Leo M. Brown**, formerly assistant sales manager, has been named sales manager of St. Paul Hydraulic Hoist, Minneapolis, succeeding William F. Keeton, who resigned to enter business for himself. Before joining the Gar Wood organization in 1949, Mr. Brown was employed as a construction engineer for E. I. du Pont and as sales manager for Truck Equipment Co.

**Earl H. Schaub**, formerly Boston division sales manager of The General Tire & Rubber Co., has been promoted to the position of manager, new distribution, with headquarters in Akron. Mr. Schaub has been active in rubber-industry sales work for 19 yr, and prior to his new assignment had headed the divisional sales operations for General's Buffalo, Denver and Boston divisions.

**James S. McCullough** has assumed charge of sales promotion for the Industrial Div. of Gould-National Batteries, Inc., Trenton, N. J. Mr. McCullough formerly directed advertising for the Industrial Truck Div. of The Yale & Towne Mfg. Co. and recently resigned as advertising and sales promotion manager of Lamson Corp., Syracuse, N. Y.

**Norton Co.**, Worcester, Mass., has appointed Roderick L. Smith field engineer in the Chicago territory and Philip H. Threshie Jr. field engineer for its Pacific Coast district. Mr. Smith has served as grinding engineer in the sales engineering department for the past year, and Mr. Threshie formerly was assistant purchasing agent for the Acushnet Process Co.

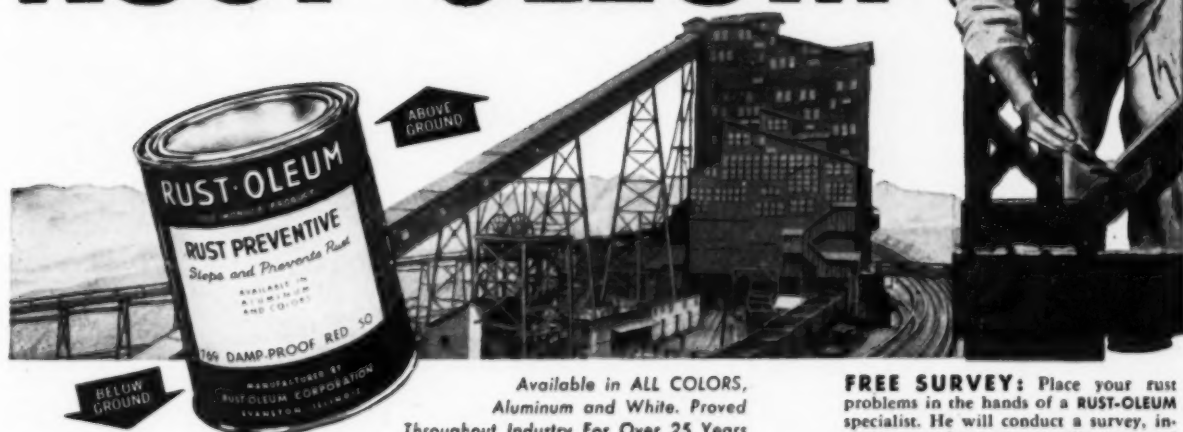
Opening of special factory training courses in servicing Euclid earthmoving equipment has been announced by The Euclid Road Machinery Co. Courses being conducted from November to early Spring include four beginning and four advanced training courses, each lasting a week. The school is open to representatives of equipment distributors, customers and others. Complete enrollment information is available from Service Training, The Euclid Road Machinery Co., Cleveland 17, Ohio, or from Euclid distributors.



# STOP RUST!

with

## RUST-OLEUM



Deep underground pipes, coal cars, machinery — tipples and surface equipment — all *rustable* metal surfaces need **RUST-OLEUM!** The *exclusive* formula that resists fumes, moisture, weathering, most acids and chemicals! Goes on easily by brush, dip or spray . . . dries to a firm, *decorative* finish!

May be applied over surfaces *already rusted* after wirebrushing and scraping. Specify **RUST-OLEUM** to your painting contractor or maintenance department for new construction, maintenance or remodeling. Prompt delivery from Industrial Distributor stocks in principal cities. Write for *complete literature* — *today!*

**RUST-OLEUM CORPORATION**  
2461 Oakton Street — Evanston, Illinois

Available in ALL COLORS,  
Aluminum and White. Proved  
Throughout Industry For Over 25 Years

**FREE SURVEY:** Place your rust problems in the hands of a **RUST-OLEUM** specialist. He will conduct a survey, including *applications, specific tests and recommendations*. No cost or obligation. See Sweets for catalog, and nearest **RUST-OLEUM** distributor, or write for literature on your company letterhead!



It's Easy To Get The Facts —  
Clip This To Your Letterhead

- ☐ We Have A Rust Problem — Have A Qualified Representative Call
- ☐ Free Survey
- ☐ Complete Literature
- ☐ Nearest **RUST-OLEUM** Source

# Cut Cost Figures in MINING



Torque multiplication up-to-6 times—combined with smooth, powerful, *automatic* torque converter braking—are making these Dart Model 140 Trucks stand out in hauling performance and operating economy at the Pickands-Mather Company's West Hill Mine at Coleraine, Minnesota.

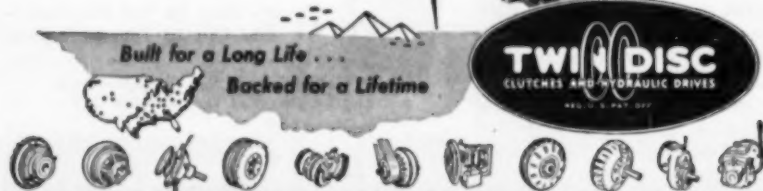
The power of their 300 hp Cummins NHRS Diesel engines is delivered through Twin Disc Model CF Torque Converters—providing smooth uninterrupted acceleration on steep pulls—as power transmitted stays in balance with load demands. Operators control their trucks both on the steep up-grade and downhill runs with the accelerator—seldom have to shift gears, or touch the brake pedal.

In heavy-duty off-highway trucking applications, Twin Disc Model CF Torque Converters are contributing to bigger payloads handled

faster... and sharply reduced equipment maintenance costs.

Get the full story on Twin Disc Torque Converters for all on-and-off-highway trucking applications. Write for Bulletin 501.

Twin Disc offers two truck type torque converters—Model CF (top) with automatic torque multiplication and downhill braking for foot-pedal control on short, steep, up-and-down hauls—and Model DF (below) with selective operation on all functions—downhill braking, uphill pulling, and Direct Drive for the straightaways.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin - HYDRAULIC DIVISION, Rockford, Illinois  
BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • MIAMI • NEW ORLEANS • SEATTLE • TULSA

John S. Speer II has been appointed sales manager of the Speer resistor division and Jeffers electronics division, Speer Carbon Co., St. Marys, Pa.

National Bearing Div., American Brake Shoe Co., St. Louis, has appointed Albert L. Hunt manager of industrial sales. Mr. Hunt, with the company since 1936 in engineering, operating and sales, formerly was general superintendent of foundries for the division.

Pyramid Steel Co., Cleveland, has named R. B. Chessin general manager in charge of sales and merchandising. For the past 6 yr, Mr. Chessin has been connected with Allied Steel Products as assistant sales manager.

Establishment of a factory parts depot in Atlanta, Ga., has been announced by Wooldridge Mfg. Co. as part of a continuing program to provide more rapid parts replacements to Wooldridge earth-moving-equipment owners and dealers throughout the Southeastern and Central States. The new parts depot has been established in cooperation with Statham Machinery & Equipment Co., Wooldridge distributor, at 671 Ford Place, N.E. Factory sales and service representation will be maintained in connection with the depot.

Delta-Star Electric Co. has been merged into the parent company, H. K. Porter Co., Inc., and will operate as Delta-Star Electric Div. Policies, management and operation of the new division will remain the same, with C. S. Beattie continuing as general manager of the division. Both Mr. Beattie and R. E. Anderson have been elected vice presidents of H. K. Porter Co., Inc.

The John Hewson Co., New York, has opened Chicago offices at 6349 North Western. Robert H. Metz Jr. has been appointed district manager in charge of sales, field applications and servicing in the area.

The Foxboro Co., Foxboro, Mass., has acquired new factory facilities doubling the area for the assembly and warehousing of control valves at Dallas, Texas, to facilitate rapid delivery and service to industries throughout the South and Southwest which have been served from the Dallas Branch for over 20 yr. Also indicative of the trend towards custom-engineering control are the recently expanded valve production facilities at the Foxboro home factory, supplemented by Foxboro branch factory assembly and service at Pittsburgh and San Francisco, the company reports.

Opening of Canada's first refinery for the production of pure tungsten carbide directly from tungsten ores was reported by Philip M. McKenna, president of Kennametal, Inc., after a 10-day visit to their new works, known as Macro Div. of Kennametal, Inc., at Port Coquitlam, B. C. Both domestic and foreign ores are refined by the McKenna (direct smelting and refining) processes on which Kennametal has been granted Canadian and United States patents. The 99.9% tungsten carbide is supplied to Kennametal of Canada, Ltd., for making min-

**C & P Coal Co.  
chooses**

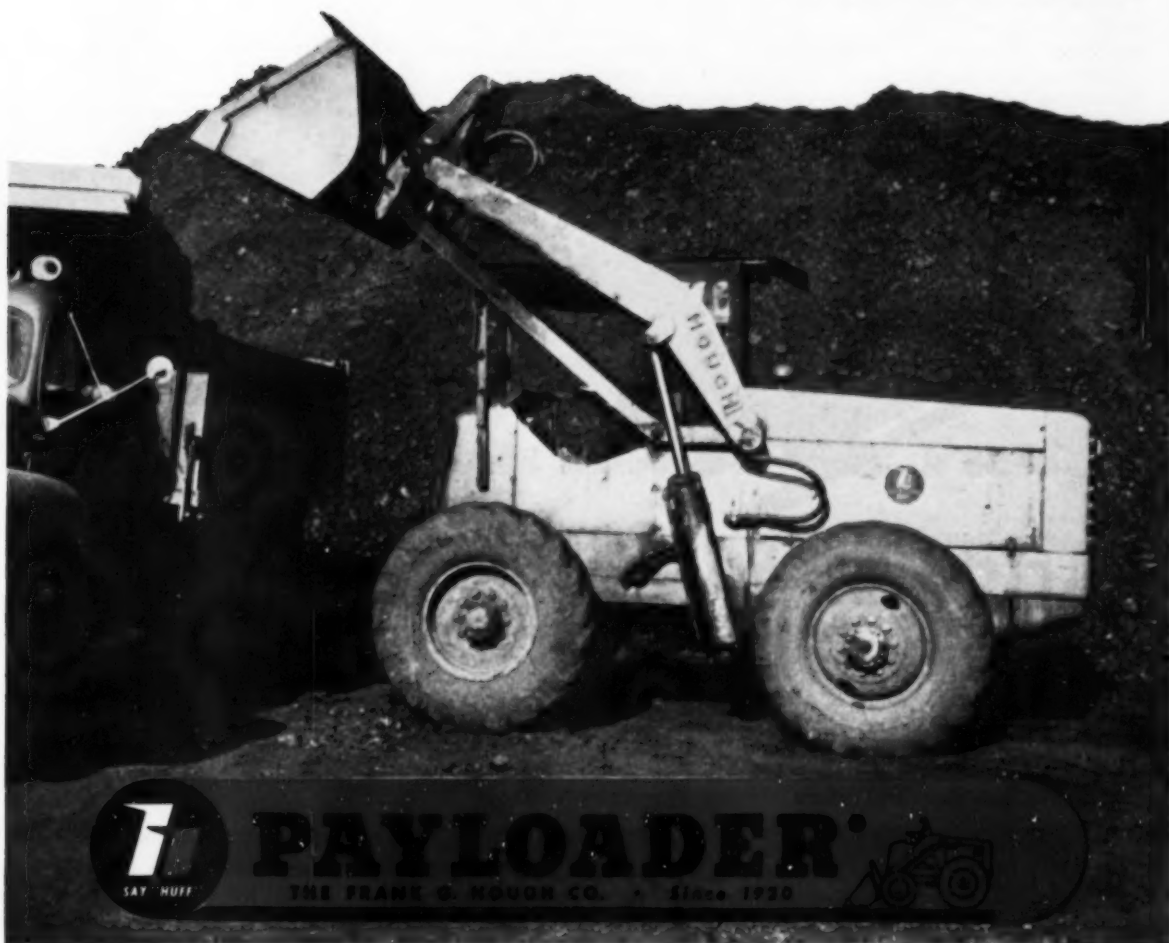
# **PAYLOADER**

C. & P. Coal Co., with strip mine at Flemington, West Virginia, has used the 4 wheel drive "PAYLOADER" for over two years with profit and satisfaction.

Their big 1½ cu. yd. "PAYLOADER" loads trucks at the stockpiles, levels and trims stockpiles, feeds conveyors from stockpile, delivers cars to the loading tippie and does many other lifting, carrying and moving jobs around the tippie and in the strip pit.

Mr. C. T. Railing, partner, says, "The "PAYLOADER" has been a life saver to us as we can stock coal when cars are not available and avoid shutting the strip job down. Also if the haul road is bad, we can continue to load cars from the stockpile and thus keep our car rating. The "PAYLOADER" is a handy piece of equipment to have on the job."

Whether your mine is underground or strip, the records show that "PAYLOADER" tractor shovels can be of great assistance in cutting costs and improving operations in many directions. Get full "PAYLOADER" facts from your Hough Distributor or write The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Ill.





# don't hitch hike



## ...ride a "JEEP"

The Lee-Norse TJ1 Mine Jeep gets you there safely! Here's the best answer for speedier underground transportation to and from working faces and emergency areas for mine superintendents, engineers, inspectors and maintenance personnel. A versatile performer the Lee-Norse Jeep can be used to pull man-trip cars, fire-fighting equipment and can be quickly placed in service as an ambulance. Detailed data available on request. Write now!



## ...ride a "SCOOTER"

No reason for mechanics, pumpers, fire bosses and other maintenance personnel to lose valuable time hitch-hiking when there is a Lee-Norse Scooter at hand. Weighing approximately 1000 lbs., the Scooter is popularly priced and its low-operating cost fits into every mine budget. The Scooter has a 48" wheelbase, is 9' in overall length and is available in all track gauges from 36" to 48". Where time is a factor the Lee-Norse Scooter is a "must". Send today for complete information and prices.

**Lee-Norse Company**  
CHARLEROI, PA.

ing tools in Canada, and initial orders have been received from its associated company, Kennametal, Canada, Ltd., and from Kennametal, Inc., of Latrobe, Pa.

### Kentucky Institute Views Developments

Begins on p 142

the shells up at least 10 in in the overlying No. 12 coal. In this coal, it takes 150-lb torque to obtain 15,000-lb pull.

On the whole, roof-bolting using up to 36-in bolts is faster than timbering while with 72-in bolts it is usually slower. Water for allaying dust has not proved satisfactory with percussion drilling. With 72-in drill steel, there is difficulty in forcing the water up to the end of the bit. Recovery of shell-type bolts has not come up to the expected 70% for bolts and 90% for shells, principally because many hex-head bolts were used and those heads rounded on attempts to loosen them. Furthermore, the holes had not been held to a minimum diameter, permitting distortion that ruined the shells.

### Germanium From Coal

Recovery of germanium was discussed by Dr. A. J. W. Headlee, West Virginia Geological Survey, bringing up to date the talk he gave at the spring meeting of the West Virginia Coal Mining Institute (Coal Age, August 1952, p 154). Germanium is the rare metal which can be used to rectify electric current and in the form of transistors of tiny proportions can take the place of many vacuum tubes requiring 100 times as much current to operate. Germanium oxide is worth \$142 per lb.

The first samplings by 1-in steps showed concentrations of Germanium in the first 3 to 5 in of top and bottom coals, and later samplings by 1/4-in steps have indicated still greater concentrations very close to the top and bottom and close to partings, Dr. Headlee reported.

The best measure of concentration has been found to be parts per million of ash-free coal instead of parts of the minerals in the coal. Screening did not effect concentration and washing the screened fractions had little or no effect. Low-volatile coals in West Virginia tend to run lower in germanium than high-volatile coals.

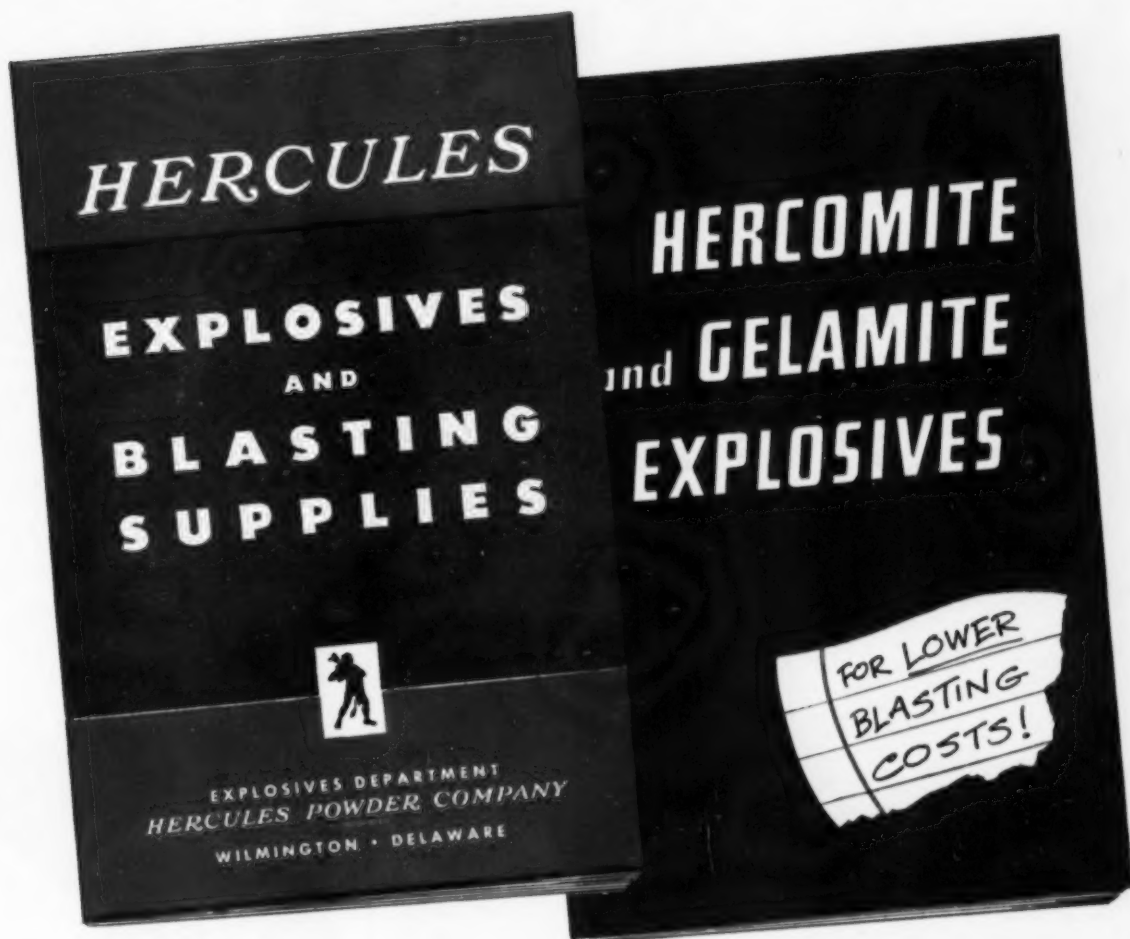
Germanium now is being recovered from stack ash in England and certain other countries but that probably totals only a few hundred pounds per year. Dr. Handlee passed out leaflets issued by the Pennsylvania Coal & Coke Corp. providing instructions for sampling seams for determination of germanium and instructing that samples be sent prepaid to Dr. A. Paul Thompson, director of research, The Eagle Picher Co., Joplin, Mo.

### Coal-Mining Problems From Oil- and Gas-Well Development

Losses by coal mining companies caused by oil and gas wells that pene-  
(Continued on p 170)



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Here's the latest information on Hercules' complete line of explosives and blasting supplies . . . a total of 80 pages of valuable data on these products for mining, quarrying, construction, and seismic exploration. If you use explosives in any way, these two new booklets are a "must" for your engineering and purchasing departments. Write for free copies to:

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# NOW—3 MODELS of the efficient time-proved NOLAN PORTA-FEEDER

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**2 HYDRAULIC FLUID MOTOR DRIVE**  
Hose Coupled to Remote Power Unit

**3 HYDRAULIC CYLINDER TYPE**  
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These three Nolan models will help you meet every requirement and condition in spotting cars for loading . . .

*and may save you as high as  
40 minutes per shift!*

The Nolan Porta-Feeder has been in successful use in many mines for over two years. This modern method of moving cars has been accepted as the most efficient in the industry. Its ease of installation and quick movability recommends its use in any mine.

The Porta-Feeder mounts between the rails on top of the track ties, and is secured by jacks. Little or no excavation or preliminary foundation work is necessary. The construction is strong and massive. There are no ropes or cables. Reciprocating pushing dogs deliver constant forward feeding motion. We will be glad to show you a mine in your vicinity where the Nolan Porta-Feeder is operating. Write us now.



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## COAL MEN ON THE JOB . . .

RED JACKET COAL CORP., RED JACKET, W. VA.: D. W. Halstead (left), assistant superintendent, and J. A. Damron, superintendent, Keen Mountain, Va.; John F. Maurice, chief engineer for the company; Glen Sneed, tipple foreman, and Mack Morrell, purchasing agent, Keen Mountain; J. M. Edwards, section foreman in the Lower Cedar Grove seam, and J. F. Howell, assistant superintendent in charge of Mine No. 17.



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★ It is not necessary to change your present machine to accommodate our Vibrator Screens. The wedge shape of the screen wire with its non-clogging, non-blinding features permits perfect separation on wet or dry screening. The rigid construction adds considerably to the screens capability and efficiency. Proven in hundreds of installations.

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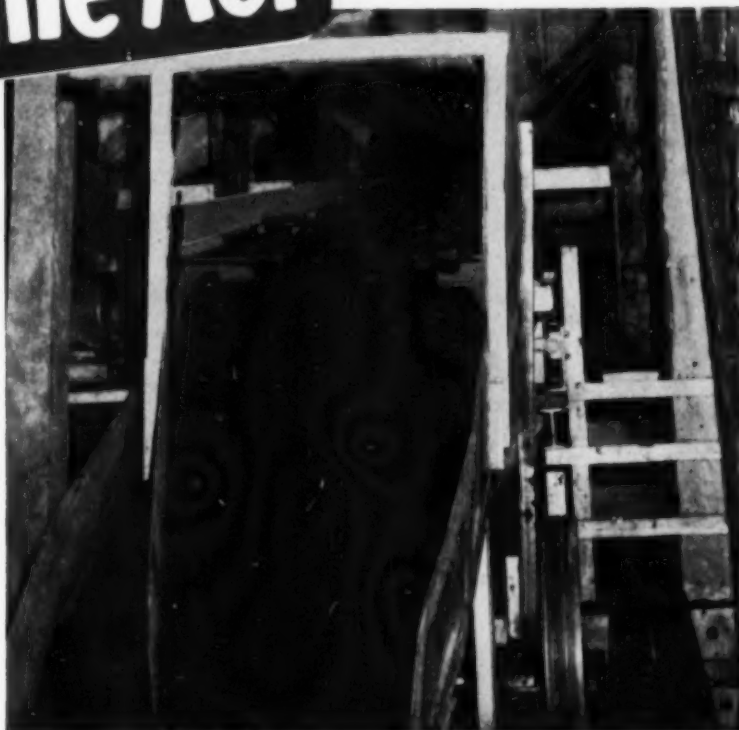
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## and Accurately Sizes Big Tonnages of Coal

480,000 tons per year of 1½" coal for one user is a big order. But it's not too big an assignment for the two Seco 5' x 14' double deck vibrating screens, the OHIO RIVER COLLIERIES COMPANY has on this job.

Here again, the accurate sizing, the smooth, trouble-free performance of Seco Vibrating screens are paying off with the desired production.



Seco's patented equalizer  
assembly

How about your operation? Are you converting your R. O. M. into the wanted sizes . . . the profit making sizes? If not, perhaps you'll be surprised to learn that you can do it for pennies per ton with dependable

Seco vibrating screens. Yes, it's a fact, many progressive operators already have learned. And you can get the right Seco vibrating screen or screens to meet your exact requirements for as many sizes as you desire to make. Why miss the extra profits that clean, properly sized coal can bring you. Take the first step today, right now, and write, wire or phone for complete information.

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THE OHIO RIVER  
COLLIERIES  
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TRUE CIRCULAR ACTION  
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## MODERNIZE NOW!

Get Your Share of the Market for Clean, Properly Sized Coal.

Let Seco engineers show you the proven low cost per ton method of producing the sizes you want.

## SCREEN EQUIPMENT CO.

1750 Walden Avenue, Buffalo 25, N. Y.  
In Canada: United Steel Corp., Toronto, Ontario

trate coal seams, said M. H. Forester, vice president, Pittsburgh Consolidation Coal Co., fall into the following categories: "(1) Interference with mine layout and projection, (2) interference with normal pillar recovery and control of overburden, (3) direct and indirect losses in well reserve pillars, (4) difficulties in ventilation and increased costs and (5) fires and explosions (which have occurred)."

In his paper, "Mutual Problems Involved in Oil and Gas Operations in Relation to Mining, Particularly in Underground Installations," Mr. Forester reviewed the entire subject, including gas, oil and gasoline lines above coal

seams, gas-storage pools underlying active coal mining properties, and repressuring storage areas because of which the coal operator may be faced with an increasing, fluctuating or higher pressure than existed during the original withdrawal of the gas.

In May of this year 142 storage projects were in operation, 101 of which were in the Appalachian region comprised of New York, Pennsylvania, Ohio, West Virginia and Kentucky. One-sixth of the natural-gas production of the United States now is being diverted to underground storage. Pressures of 500 to 1,000 psi are prevalent in the storage fields in the Appalachian area.



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When we say "greater capacity" we mean just that. Within given length, width and height, you'll realize greater cubic footage in Differential Mine cars than in any other make. Differential's special, patented, AXLESS truck design is largely responsible. There are other important benefits, also, in this Differential feature — increased safety, less spillage, easier riding, etc.

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Whether you think in terms of:

➤ **FEWER CARS REQUIRED** (therefore lower investment in equipment)

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or any of several other factors affecting your operations, you'll enjoy greater earnings with these cars. Send now for Mine Car Folder, D-53.

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# DIFFERENTIAL STEEL CAR COMPANY

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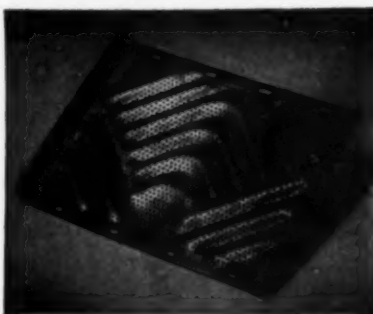
SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

"There is on record a considerable number of instances," said Mr. Forester "where mining operations have cut into uncharted or improperly located wells, with resultant explosions and loss of life. Losses were comparatively light because the gas fields were largely exhausted. Repressuring and underground storage cannot but aggravate the situation and increase the danger of catastrophe."

Safety, said Mr. Forester, should be set ahead of profits. The gas industry is motivated by "service" to the gas-consuming public, whereas the coal industry is becoming alarmed over the safety of its employees. Both industries have been moving independently to protect their rights and entrench themselves legally, but they should recognize the close relationship that already exists and the need for a wholehearted approach toward a solution and sincere cooperation between the two industries.

In discussion following the paper, Mr. Kerr said that oil and gas wells are a problem in his section. M. E. Prunty, safety director, Consolidation Coal Co. (Ky.), outlined a situation where his company had falls to the surface that caused a loss of ventilation and might have broken an 8-in gas line and endangered 250 miners. Quick action on the part of the mine superintendent brought about discovery of the gas line. The gas company cooperated by purging the line immediately and now is making plans to install a detour line.

James Westfield, chief, Health & Safety Division, U. S. Bureau of Mines, said



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Comes in Carbon and Stainless Steels and Manganese Bronze. No sag.

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**JUNIOR**

MODEL FLAME SAFETY LAMP

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**FULL-SIZE  
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There are good reasons why fire bosses and mine inspectors give their vote of approval to the M.S.A.-Wolf Junior Flame Safety Lamp. They like, first of all, its dependable, steady flame which is guarded from drafts by improved ventilation and specially-designed openings. This feature, combined with the easy-to-read standard size graduated chimney, assures utmost dependability in testing for methane, and oxygen deficiency. Its lighter weight and smaller size are comfort features that make the inspection job easier.

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Furnished in steel or aluminum, this Standard Model Flame Safety Lamp is dependable in service. The Lamp is equipped with an improved internal igniter. Approved by the U. S. Bureau of Mines, the Standard Model Flame Safety Lamp is available with magnetic lock. Write for complete construction and design details.



- ★ Light weight—cast aluminum construction.
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Shown 30" high, but  
can be made 26" high.

- Low Maintenance!
- Unequalled Performance!

The Type-F locomotive is no bigger than the average mine car. It can go anywhere in the mine without brushing. Built like a big trolley locomotive with two motors, one driving each axle. Users say they are the best in the world.



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Power end is made of high-grade semi-steel with a large cover to facilitate inspection. All moving parts are completely self-lubricating. Intermediate shaft runs on adjustable roller bearings. Furnished V-Belt or Gear Drive. Size 8 x 9, Capacity, 35 gal. per minute, 3" suction and 2" discharge.

This pump uses the leak-proof, acid-resistant FLOOD CITY REVERSIBLE WATER END—standard for replacement purposes in large and small coal mines. Write for more information on this and other Flood City Mining Equipment.

### Flood City Brass & Electric Co.

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Branch Office: 4 Virginia St. W., Charleston, W. Va.

that gas-storage area maps are not available but the Bureau is trying to help on the problem. He mentioned that one mining man in Pennsylvania persists in the opinion that the Carpentertown explosion which killed six men was caused by an underground gas-storage area although it is 7 mi away.

C. A. Sine, Big Stone Gap, Va., cited three cases where gas lines apparently caused explosions in mines. At one, in the Shawmut district of Pennsylvania, a gas line in frozen ground was broken by a mine cave and resulted in an explosion that killed four men in a mine that had not been gassy. Mr. Sisk said that Kentucky lacks laws to cope with the problem, except in a case of willful wastage.

John Forsyth, oil and gas inspector for the Kentucky Department of Mines and Minerals, pointed out that in Kentucky gas-storage areas, so far, are remote from coal mining sections. Answering a question by J. T. Parker, superintendent of coal properties, Inland Steel Co., Wheelwright, Mr. Forester said that no drilling is being done to create storage areas and that they presumably could be located remote from mining sections. The cheapest method is followed, using existing wells in partially or wholly abandoned sands. He added that potash mines in Colorado are becoming concerned about gas-storage areas under them. In Pennsylvania, a gas company has raised a line above the surface where it traversed a coal mine area. In general, however, cooperation is being secured after the fact instead of before.

### Coal's Present and Future

Carroll F. Hardy, chief engineer, Appalachian Coals, Inc., speaking on "The Position of Coal—Present and Future," warned the industry against draining its vitality by letting the present overcapacity lead to cut-throat competition. Barring that possibility, the future is bright, in spite of the serious loss of railroad locomotive fuel tonnage and the endangered domestic market, he said.

Mr. Hardy presented tables showing production figures for natural gas, fuel oil and coal and indicated for each the quantities and percentages to the various markets. He cited authorities' estimates ranging from 10 to 15 yr to 50 yr as the life of the natural-gas supply, but said that the period of extremely low gas prices is drawing to a close and that high-Btu gas manufactured from coal will be used to supplant the supply long before natural gas is actually exhausted.

While proven reserves of crude oil in North America are 11 to 12 times the current annual rate of production, Mr. Hardy said, the most optimistic experts in the petroleum industry do not predict a long life for our oil fields, as indicated by the research that major oil companies and the Government are conducting to make petroleum products from oil shale and coal.

Mr. Hardy predicted a production of 750,000,000 tons of coal in 1970, with percentage breakdowns about as follows: domestic, 10; utilities, 30; by-product and beehive ovens, 20.7; railroads, 4; general

**LIMA**

Wheel or truck mounting is available on machines of  $\frac{3}{4}$  and  $1\frac{1}{2}$  yards capacity.



## THE ALL PURPOSE MACHINE

Here are four typical examples of the versatility of the LIMA Type 604. Realizing that most contractors bid various types of work, LIMA has gone to great lengths to make a machine that is easily converted in the field to shovel, crane, dragline or pullshovel, thus giving the owner the advantage of four machines in one.

Versatility is but one of the many advantages that make the Type 604 a leader in its class. For instance, air controlled clutches do all the work—with one slight touch of the levers, the hoist, crowd, travel

and swing clutches can be engaged or disengaged, making for ease of operation. Anti-friction bearings in the drums and other important bearing points reduce destructive friction and lessens lubrication problems. Simplicity of design results in fewer working parts and greater safety for the operator.

For further information on the Type 604, write your nearest LIMA distributor or write to Baldwin - Lima - Hamilton Corporation Construction Equipment Division, Lima, Ohio, U. S. A.

CAPACITIES: Shovels  $\frac{3}{4}$  to 6 cu. yds. Cranes to 110 tons. Draglines, variable.

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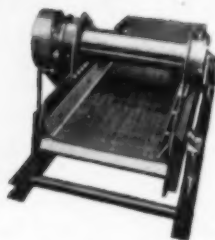
# BEE-ZEE

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round rod screens

Frozen coal in cars is not a necessary evil in your business. It can be prevented — definitely. How? It's simple. By a better job of dewatering with BEE-ZEE Round Rod Screens. It stands to reason that a curved surface like this  will drain off water quicker, more efficiently than any other type. This exclusive BEE-ZEE feature alone will end winter freeze-ups . . . will make you money.

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## BIXBY-ZIMMER Engineering Co.

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BEE-ZEE SCREENS CAN BE FITTED TO ANY SCREENING EQUIPMENT

industry, 20; export, 6.7; and miscellaneous stock and use at mines, 2.6. Referring to the railroad outlook, he said that it is not likely that the steam locomotive will be completely eliminated in the next 20 yr and that there is a possibility that the coal-fired gas turbine will be in fairly widespread use by that time.

### New Safety Laws Explained

In his paper, "Highlights of the Federal Coal-Mine-Safety Act," Mr. Westfield outlined the disasters and conditions which led to the passage of the law and then discussed its principal provisions. He said that one state, Wyoming, has qualified under the law to permit joint inspections by the states and federal inspectors.

Replying to a question by Mr. Mosgrove, Mr. Westfield said that minimum instructions on fire-fighting equipment have been issued only as internal memoranda to federal inspectors and not issued to any individual operator.

Answering questions from Mr. Starling, Mr. Westfield said that the Act does not compel a mining company to furnish a map but the Bureau would like to have such cooperation so that the inspector can trace out the ventilation on the map. Furthermore, furnishing an equipment inventory is not compulsory but one district is getting that cooperation and it can be of advantage to a coal company in proving that certain equipment was in use before the Act became effective. His reply to a question by J. H. Berry, production engineer, Consolidation Coal Co. (Ky.), indicated that although the Bureau is opposed to open shots it is still studying the scattering of rock dust by explosives.

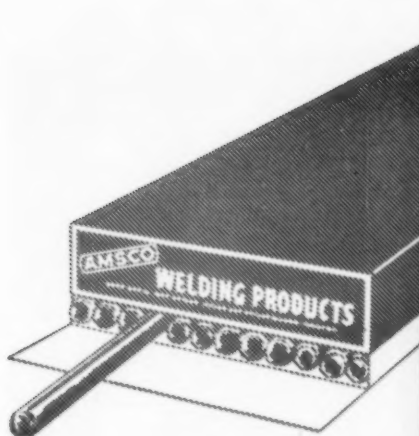
William H. Roll, executive assistant, Kentucky Department of Mines and Minerals, presented a paper explaining in considerable detail the new and changed provisions of the Kentucky Mining Law, Amended 1952 (*Coal Age*, May 1952, p 130)

### Cable-Maintenance Practices

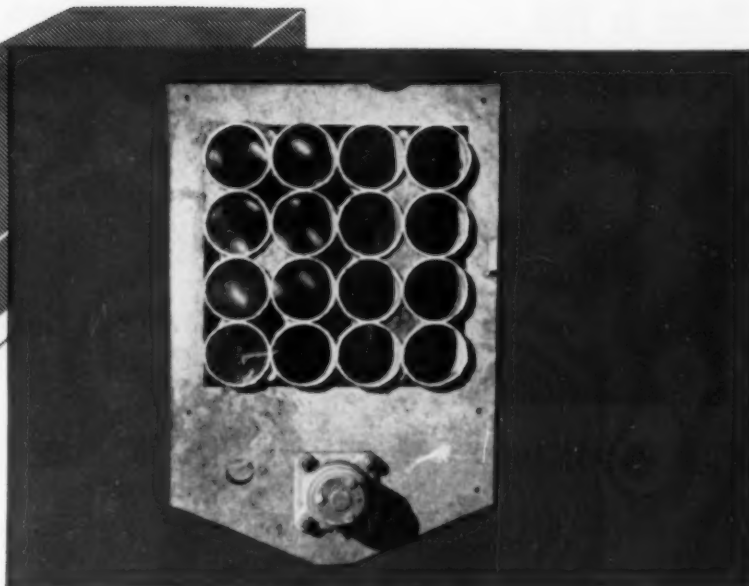
Since trailing cables are a potential hazard and none has been developed that is failure-proof, it is extremely important that every consideration be given to their maintenance, said William McGregor, chief electrician, West Kentucky Div., Bell & Zoller Coal & Mining Co., Madisonville, in a paper on cable maintenance and testing. Reels should be properly maintained and adjusted so that over-tension is not applied to the cables. Failures often originate from runovers, falling objects and abrasions on sharp ribs and corners.

Shorts in cables are potential catastrophes and efficiency as well is impaired by cable failures, Mr. McGregor emphasized. Modern splicing methods should be used to obtain splices of small size and maximum flexibility. Repaired cables should be tested completely before going into service, with a test voltage of 4,500 applied to show up damaged spots not otherwise visible. Wet cable is unsafe and should be dried by passing compressed air through the interior, a method taking from 2 or 3 days to 2 or 3 weeks depend-





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with Amsco Hardfacing Rods saves you  
materials...manpower...money



## Amscoating these briquette machine dies increases die life... reduces need for repairs



### How to AMSCOAT briquette machine dies

This procedure sheet gives complete details...the Amsco electrode to use and method of application. Also lists recommendations for other iron and steel applications. Free copy on request.

A big reduction in costs of die maintenance has been made by Amscoating with Amsco Economy Hardface "C," according to the welding superintendent of a southern plant manufacturing ferro silicon briquettes.

By using 100-110 amperes reverse polarity and depositing one pass of Economy Hardface "C" on edges of both sides of die, the need for repairs was substantially reduced.

Amsco Economy Hardface "C" is preferred because of its better service results and because of its better handling during application than types of rods used previously.

Long service life and fewer replacements through the use of Amscoating on applications means big savings. If you have equipment that is subject to wear, the possible savings to you are too big to be overlooked!

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**Brake Shoe**

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there is NO  
substitute . . .



## MPC WOOD-LINED PIPE

**MEETS ALL THE  
REQUIREMENTS FOR  
A DEPENDABLE  
MINE PIPE**

### COMBINES THE STRENGTH OF STEEL WITH THE DURABILITY OF WOOD

MPC Wood-Lined Steel pipe is ideally suited for acid mine waters, culm, and slurries to pressures up to 400 psi. The wood lining, made of clear redwood, Douglas fir, or pine staves, is offered in thicknesses from 11/16" through 3", while the outer carbon steel shell is available from 14 gauge through schedule 80 thickness. Flanges, welded to the pipe, carry ratings of 125 lb. upwards, with A.S.M.E. bolt circle or special drilling. Pipe sections 10' and 20' regular lengths or fabricated to suit. Internal diameters 4" through 48". Pipe exteriors protected against corrosion. Wood-lined fittings available for all diameters in standard and special designs.

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## COAL MEN ON THE JOB . . .



**PENNSYLVANIA ANTHRACITE:** Ralph Cannon, shift foreman, Locust Summit flotation plant, Philadelphia & Reading Coal & Iron Co.



**RED JACKET COAL CORP.,** Keen Mountain, Va.: S. W. Altizer (left), resident engineer; and Bill Bohon, chief electrician.

ing on the amount of wicking in the cable.

Gene Wissenger, engineer, National Mine Service Co., Indiana, Pa., demonstrated with actual apparatus on the stage the detection of weak spots in cable insulation by applying high voltage.

Fourteen fires were reported at Kentucky mines during the past "Institute" year by Mr. Sisk. There were no explosions. The fires were classified by causes as follows: 6, electrical origin; 1, open fire; 3, friction of rubber belts; 1, black powder; 1, spontaneous combustion; 1, cutting torch; and 1, unknown. In only one case were any men hurt, the torch-cutting accident in which a red-hot steel beam fell to the floor, raised and ignited coal dust causing burning of three men.

### Coal Mining Institute Holds 66th Annual Meet Begins on p 150

checkered top. Mining at Gibson is in the Pittsburgh seam which is about 5½ ft thick with about 1 ft of drawslate as the immediate top. Above the drawslate is a layer of low-grade coal, fireclay and shale from 6 to 8 ft thick, then the main roof of sandy shale or sandrock.

The mixture of coal, shale and fireclay has very little structural strength. Consequently it flows into the openings under the pressure of the overburden. This required constant cleaning of the haulageways and the falling material resulted in gradual enlargement of the entries, Mr. Dartnell said.

The masonry arches are constructed of 4x8x16-in concrete blocks and mortar and the operation has been standardized to eliminate as much labor as possible. In the past 5 yr over 300 have been built with no sign of failure in any one of them.

The arch consists of two upright piers holding the 32-block arch which is laid up on a prefabricated template made of

spring steel. Blocks in the piers at the spring of the arch project 2 in to hold the template while the arch is built. Then the space above the arch is filled in with more blocks and mortar leaving room at the top for steel rails which are laid as lagging across the tops of adjacent arches.

While costs vary with the conditions encountered, Mr. Dartnell reported that the average is about \$6 per lineal foot of entry for materials and \$7 per lineal foot for labor, which compare favorably with the costs of supporting by other means under these conditions. The men work from a platform which spans the entry over the haulage road and is supported by steel rails which are passed through holes left in the piers as they are built.

"In building these arches, we have taken advantage of the greater strength of materials in compression as against materials in tension and have developed what we feel is a permanent structure which is easy to build, not too costly and not affected by rust or decay."

• In reporting the results of tests made on various roof-coating compounds, Mr. Carnek warned that the nature of many of the solvents demands that strict rules be followed in applying the materials to limit toxic and flammable effects.

Among the precautions to be taken, Mr. Carnek listed the following:

1. Know what analyses of the particular compound show concerning the kind of solvent, its flash point, whether the solvent or base material have a toxic effect on the men doing the spraying, the possibility of ignition at the point of spraying, whether the vapor-air mixture while the solvent is evaporating is explosive or flammable and whether the base matter ignites or will support combustion.

2. Transport the material in tightly closed tanks.

3. Spraying should be done on idle days or on the offshift when men are out of the mine or section being sprayed. The men doing the work should be thor-

# ***252 tons per hour***

**on 35-mile round trip haul  
averaged by  
12 MACK TRUCKS**



● Here's a hauling operation that points up the ability of Mack trucks to keep the big loads moving on fast, profit-making schedules.

It's the story of 12 Mack Model LHSW diesel-powered six-wheelers operated by Morrison-Knudsen Company and used to transport phosphate ore a distance of 17½ miles from the mines to the Monsanto Chemical plant in Soda Springs, Idaho. Working in rugged, rolling mountain country—with an altitude difference of 900 feet between the two points—each of these Macks loads out with 21 tons of ore and averages a little less than one hour for the 35-mile round trip.

All together the twelve Macks keep 252 tons flowing hourly into the Monsanto plant—dependable, unfailing performance that has confirmed the wisdom of Morrison-Knudsen in selecting Mack trucks.

It will pay you, too, to see your nearest Mack branch or distributor and find out what it means to have sturdy Mack trucks shouldering your loads—with greater profit to you.

One of 12 Macks equipped with "drop bottom" semi-trailers, operated by Morrison-Knudsen Company, shown loading up at the phosphate mine.

En route between the mine and chemical plant, the trucks roll along against a background of rugged, mountain country.



**...outlast them all**

Mack Trucks, Empire State Building, New York 1, N. Y.  
Factory branches and distributors in all principal cities for  
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## Eliminate 70% to 90% of Conveyor Downtime



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## MOTORIZED HEAD PULLEYS

eliminate maintenance on chains, belts, sprockets, Universal drives, countershafts, etc.

## EVERYTHING is contained INSIDE the pulley shell!

HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock Motorized Head Pulley is simply a new application of the long-proven gear reduction drive, with everything... electric motor, reduction gears and all moving parts... contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about

the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

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oughly trained in the proper practices, the hazards involved and the limitations of the materials. The work should be in charge of a certified foreman.

4. Ample ventilation should be provided wherever the spraying is done.

5. Open lights must be prohibited in the spraying area.

6. Power should be cut off from the mine or section where spraying is in progress. If electric power is absolutely necessary, it should be obtained through a trailing cable and not through the trolley wire.

7. Trolley wires should be covered with rubber hose to prevent the material from depositing on the wire.

8. Men doing the work should be provided with respirators, goggles, masks, hoods and gloves to prevent skin damage.

9. In Pennsylvania, do not use a roof-coating material until it has the approval of the Secretary of Mines.

• In outlining the Bureau's position on expressing opinions on roof-coating compounds, Mr. Berger declared that approval of any product or equipment may be granted by the Bureau only after the product or equipment has successfully met certain requirements in published schedules that state the provisions under which approval may be granted. Only products which by virtue of their design or function come under the scope of such schedules may be considered for approval, and Bureau personnel is not permitted to comment on the quality or performance of products that do not come within the scope of the published schedules. Therefore, Mr. Berger said, the purpose of his paper was to present his views on some points which should be considered in setting up a schedule for roof-coating materials.

Mr. Berger's list of general suggestions concerning the composition of coating materials for mine use and the manner of handling and applying these materials is as follows:

1. The material should present a minimum hazard from flammability during handling and application and when in place as a permanent coating.

2. The material should not contain any constituent having a high order of acute or chronic toxicity or otherwise potentially injurious to those who use it.

3. Those using the coating materials should have protective clothing, skin creams if necessary, and respirators.

4. Adequate ventilation should be provided throughout the time the work is done and while the solvent vapors are emanating from the coating.

5. The men should work only on the intake side of the ventilating current and should move back against the ventilating current while spraying.

6. No person should be permitted on the return side while the solvent vapors are emanating.

7. Potential sources of ignition should be eliminated from the working area and in the returns as long as vapor is emanating.

• In relating his company's efforts to cope with spalling roof through the use of sprayable materials, Mr. Schrecengost told of the waste and physical hazards





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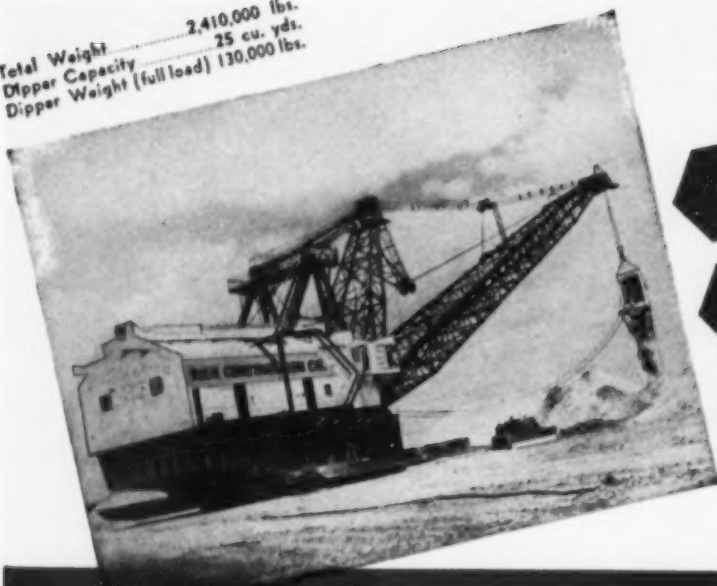
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accompanying the use of sand-cement coatings. Then an investigation of bituminous coatings was begun. However, at Cadogan mine, a fire occurred in the coating material soon after its application. Mr. Schrecengost reported, the ignition being the result of an arc from the trolley locomotive which was used to haul the hotwater heating tank for the coating and the air compressor. The fire spread rapidly over the coated area and was stopped only against a closed door and at a gap in the coating which was left to accommodate a proposed overcast. Fortunately, fire-fighting equipment and breathing apparatus were available and the fire was quickly controlled.

Thereafter, coated areas were sprayed with water then dusted with portland cement from a rock duster, Mr. Schrecengost said. Shortly thereafter the secretary of mines in Pennsylvania instituted controls over the use of such materials.

In the discussion, it was brought out that it would be possible for a coating on the trolley wire to interfere with current collection, thus causing the arc. The need for covering the wire during application of the coating was again emphasized.

Also, Anthony Shacikoski, general superintendent, Leechburg Mining Co., Leechburg, Pa., brought out the fact that there is a difficult choice to be made: Is safety better served by taking all possible precautions in the use of coating compounds to prevent spalling or by prohibiting their use and taking one's chances with the falls. Mr. Shacikoski reported a greater measure of success, safetywise and moneywise, with the roof coated. Since the practice was stopped two motormen have been injured and great expense has been incurred in cleaning up the fallen material in the haulageways.

#### SUSPENSION SUPPORTS

At the Friday morning session, Mr. Snure presiding, papers on roof-bolting and dust collection were presented by D. C. Ridenour, chief engineer, Olga Coal Co., Coalwood, W. Va.; George J. Steinhiser, mine inspector, Pa. Dept. of Mines, Uniontown, Pa.; Harold E. Shomper, anthracite mine inspector, Pa. Dept. of Mines, Shamokin, Pa.; and L. B. Berger, chief, health branch, USBM, Pittsburgh.

• While roof bolting is a high-cost proposition at the mines of the Olga Coal Co., Mr. Ridenour said, the method of roof support has the advantages of (1) eliminating the danger of knocking out timbers, (2) eliminating the cost of cleaning up the coal that sloughs from the ribs as it does in the Pocahontas No. 4 seam, (3) eliminating the need for carrier bars at intersections and (4) permitting closer-to-the-face support of the roof without interfering with loading. Furthermore, the 7-ft height of the seam is reduced about a foot between first and second mining, making it necessary to constantly replace timbers in the crushed areas.

Three types of roof are encountered, one a massive sandstone that requires only posts 5 ft apart along both sides of 18-ft wide places and a safety crossbar at the face; another of laminated sandstone

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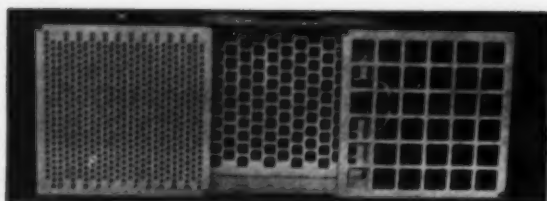
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which requires crossbars on 5-ft centers or closer; and the third, which is a draw-slate of variable thickness between the coal and massive sandstone. The variable thickness makes it tempting to vary the length of the bolts, but the company has standardized on 4-ft bolts with longer ones used at the discretion of the foreman, Mr. Ridenour said.

Mining is done on the block system with blocks 75x90 ft in area and development faces 18 ft wide. Bolting is done in the entries, breakthroughs and rooms which are to remain open for some time but will not be done in pillar work. The 1-in bolts are placed on 4-ft centers with 6x6x¾-in plates for bearing.

During the month of October 6,981 bolts were set at Olga No. 2 at a rate of 51.1 bolts per shift for a three-man crew at a labor cost of \$1.12 per bolt and a total cost of \$2,715 per bolt. The savings in roof bolting over timbering is \$1.092 per ton of pillar coal. In a given acreage, 61% of the coal mined is from pillars. Therefore, if roof conditions were such as to warrant roof-bolting, the savings based upon the total tonnage would be \$0.67 per ton, Mr. Ridenour concluded.

• In recounting the history of roof-bolting in Pennsylvania, Mr. Steinheiser reported that seven permits have been granted by the Department of Mines after approval of the bolting plans submitted to the department. In general, the program has been more successful in western Pennsylvania than in the central part of the state.

Concerning the western part of the state, Mr. Steinheiser reported as follows:

1. Approximately 202 mi of opening have been bolted, and in about 44 mi no auxiliary timber was used. Approximately 4,289,000 tons have been mined from bolted areas without a lost-time accident from roof falls.

2. These results were obtained under various roof conditions from good to bad.

3. Jones & Laughlin Steel Corp., operating three mines in the Pittsburgh seam, lead with a total of 38.7 mi of bolted openings. Five falls occurred in bolted areas, all of them coming several months after the bolts were installed. Three of these occurred in worked-out sections. Four of the five occurred at intersections, and in all cases both bolts and conventional timbers failed to hold the top.

• In reporting on anthracite, Mr. Shomper pointed out that the first installation in the region was made about 25 yr ago in a pumproom at Hazleton Shaft colliery where 24 rods were used to pin a 6-in slab of sandstone to a massive sandrock above it.

In the Northern field, Mr. Shomper reported, a heading in the Dunmore No. 4 seam, developed many years before without timber, was bolted for 1,000 ft in a striking test. The bolted roof was to be subjected to pressures that would result from drawing pillars in the seam above. Previous experience always showed that a timbered opening under such stress always caved, but the bolted roof remained intact despite tremendous pressure which caused the ribs to slough and the bottom to heave.

To date, one permit has been granted



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No. 360 Rotary Dry Rock Drilling  
Head Gives Amazing Results  
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The New No. 360 COALMASTER 6 1/2" ROCKET HEAD equipped with COALMASTER No. 4T Expanda Bits. It can also be equipped with COALMASTER 4F or 4XLF hard-surfaced bits for less severe drilling at lower cost. Available in 6 1/2" and 9" sizes.

## PHOTO OF COMPETITIVE BITS

Unretouched photo of set of 7 tungsten carbide tipped bits from a well-known competitive rock drilling head after drilling only 6 feet in hard sandstone. Note how bits were either worn down to the head socket top or "mushroomed" beyond recognition. The head was so hot from friction it could not be touched for 30 minutes and was severely damaged by side and top "wash".



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80%

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## PHOTO OF COALMASTER BITS

Unretouched photo of 9 tungsten carbide tipped COALMASTER 4T Expanda Bits from the ROCKET HEAD after drilling 24 feet of extremely hard sandstone laced with pyritic bands in the same hole. Note that six of the bits had a remaining life of 90% or better; two were rated 80% or better. Only one was extensively worn; it had 15-20% useful life left and would normally be scrapped. The drill head itself showed only normal wear and was undamaged by friction heat caused by side or top "wash".

Performance speaks louder than claims . . . This test was held October 4, 1952 at a strip mine in western Kentucky with an overburden of 30 to 40 feet of extremely hard sandstone laced with pyritic bands . . . among the most difficult to drill in the entire Midwest. The results reported herewith are supported by affidavits of a number of competent witnesses who observed the tests.

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5. Alloy steel bits, hard-surfaced steel or carbide tipped bits can be used in the head.
6. The shape and positioning of the bits, wedge and head sockets is such that bits cannot be lost.
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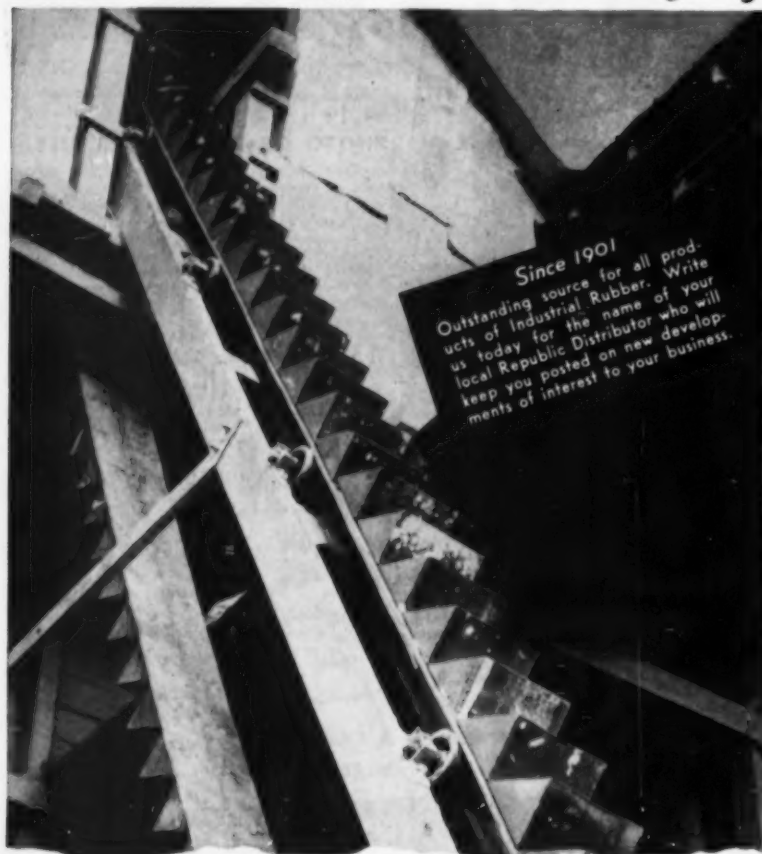
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Lehigh Navigation Coal Co., Lansford, Pa., and a request for a permit by The Hudson Coal Co. is under study by a commission of mine inspectors. Mr. Shomper concluded that roof bolting in the anthracite region is not out of the experimental stage. Much is to be learned and proved by trial.

● Mr. Berger's paper on dry dust collectors for use with roof-bolting was presented by John P. Harmon, mining engineer, USBM, Pittsburgh. In relating some of the factors to be considered in the design of dry dust collectors, Mr. Berger noted that there must be a compromise in the closeness of fit of the collector head around the drill steel. The head must fit tight enough to prevent the escape of dust particles but it must not be so tight that the entrance of transporting air will be prevented. Furthermore, tests in Pittsburgh-seam roof indicate that it may be drilled at a rate of 4 fpm (1 3/4-in hole) which means a dust load of 6 1/2 lb per min to be collected and transported. Where possible, gravity should be utilized to separate larger cuttings from the finer dust to reduce the energy required for the collection operation.

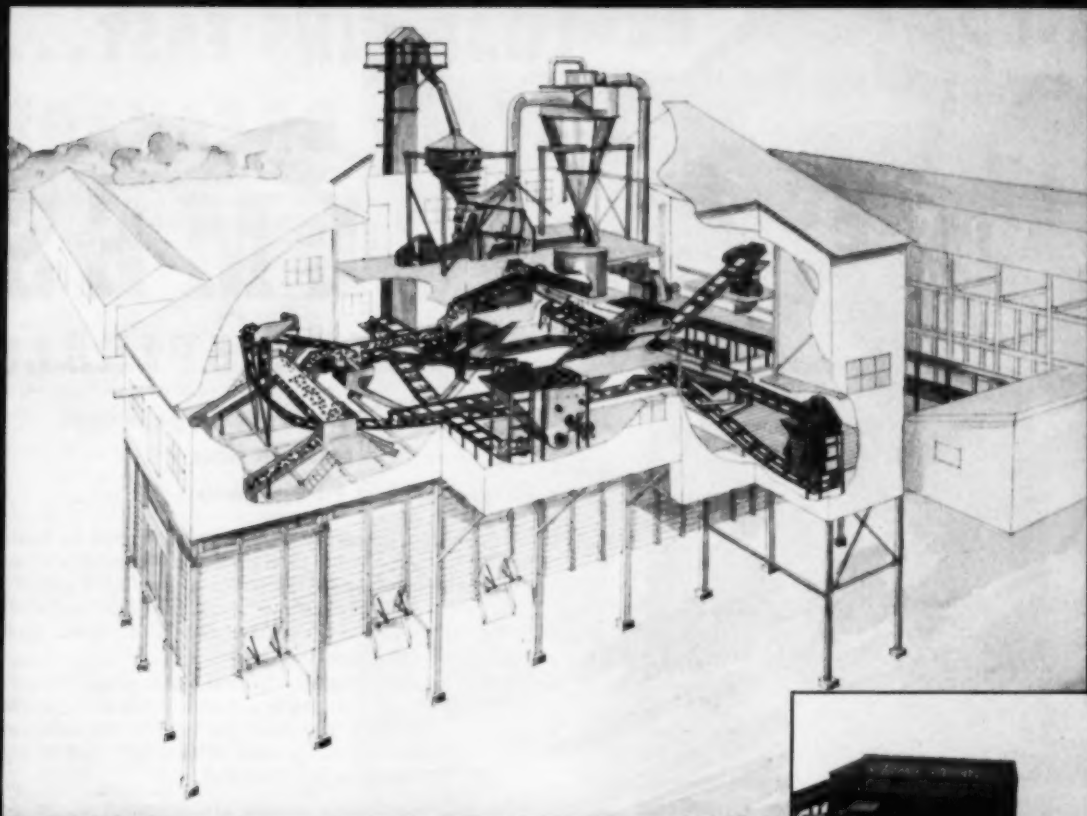
In advocating further study, Mr. Berger stated that more comprehensive data are needed on required air-transport velocities as related to particle size, shape and density, and data on the capacity of collectors operated under different conditions should be assembled.

Mr. Berger declared that although a Bureau of Mines schedule has been published and several collectors have been approved, it is hoped that this fact will not produce a spirit of relaxation or a feeling that the problem has been licked. There is room for new ideas and new mining and drilling methods may give rise to new dust-collection problems.

At the final session on Friday afternoon, lead-off speaker was R. B. Hewes, associate professor in charge of supervisory training, Mineral Industries Extension Services, Pennsylvania State College, State College, Pa., speaking on the subject, "Supervisory Training of Mine Officials." Also, the problem of stream pollution from mine refuse was formally discussed in papers by Richard Maize, secretary, Pa. Department of Mines, Harrisburg, Pa.; L. S. Morgan, division engineer, Pa. Department of Health, Greensburg, Pa.; and Dr. S. A. Braley, senior fellow, Mellon Institute of Industrial Research, University of Pittsburgh. Mr. Maize's paper was presented by C. H. Maize, state mine inspector, Gray, Pa. Session chairman was W. G. Stevenson, general manager of mines, Hillman Coal & Coke Co., Pittsburgh.

#### SUPERVISORY TRAINING

● In essence, programs for the training or development of management personnel all have the common goal of developing a staff of people who will act as a unit in directing the affairs of a company, Mr. Hewes declared, in pointing out the need for promoting "parallel thinking" at all levels of management. While the task of maintaining balance among the various elements that must be considered in mod-



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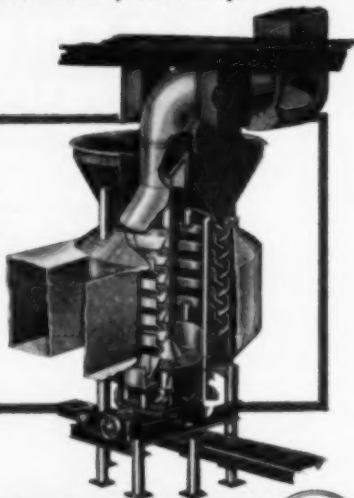
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ern mining is a top-management function, supervisors on the lower levels must be conditioned to accept changes in emphasis among these elements and to react to such changes as their superiors would.

To achieve this desirable state of affairs, Mr. Hewes advocated that the mining industry provide assistance of a continuing nature to help supervisors in the administration of their duties and the solution of their problems.

In pointing out that the industry has been a leader in promoting training for sub-supervisory employees, Mr. Hewes noted a greater need for the training of men who already hold management positions.

Going to the fundamentals to be served in training of this type, Mr. Hewes asserted that the training of supervisors cannot be considered as a terminal process. It is a continuing, though intermittent, way of life, and is just as important to the health of a company as any maintenance or production program. Furthermore, the training will not reach its full measure of success without the sincere backing of all management. Mere "general interest" is not good enough. Finally, management should have an objective and should investigate the program constantly to determine whether progress is satisfactory.

On the question of who should do the training, Mr. Hewes suggest the services of professional conference leaders to encourage discussion among the trainees and to place the program in charge of someone who is not superior to them in the chain of command. On matters of cost and the anticipated rate of progress, Mr. Hewes pointed out that cost is relative and progress is slow. But if the cost seems high, it should be compared with losses that result from failures in planning, failures to deal intelligently with complaints and other causes for low production. As to progress, it may be a year before any results show, and perhaps not then, but sooner or later the benefits of a good training program will show up in lower cost per ton.

#### STREAM POLLUTION

• In relating the history of the mine sealing program in Pennsylvania, Mr. Maize pointed out some of the great strides that have been made since 1947 when the first state appropriation for the work was granted and the magnitude of that portion of the problem which still remains. In fact, in the third year of the sealing activities, the water-supply reservoir of the city of Barnesboro was reduced to a dangerously low level, but superior water was available in the run-off from the sealed mining area nearby. Now the city is taking its water supply from this run-off. Also, the Casselman River, once badly polluted by mine waste, now supports a growing fish population.

Mr. Maize explained that the requirements of the mine sealing act of the legislature were not retroactively binding. All openings abandoned prior to the passage of the act were to be sealed by the Department of Mines, and those abandoned after the passage of the act would be sealed by the owner of the mine. Since

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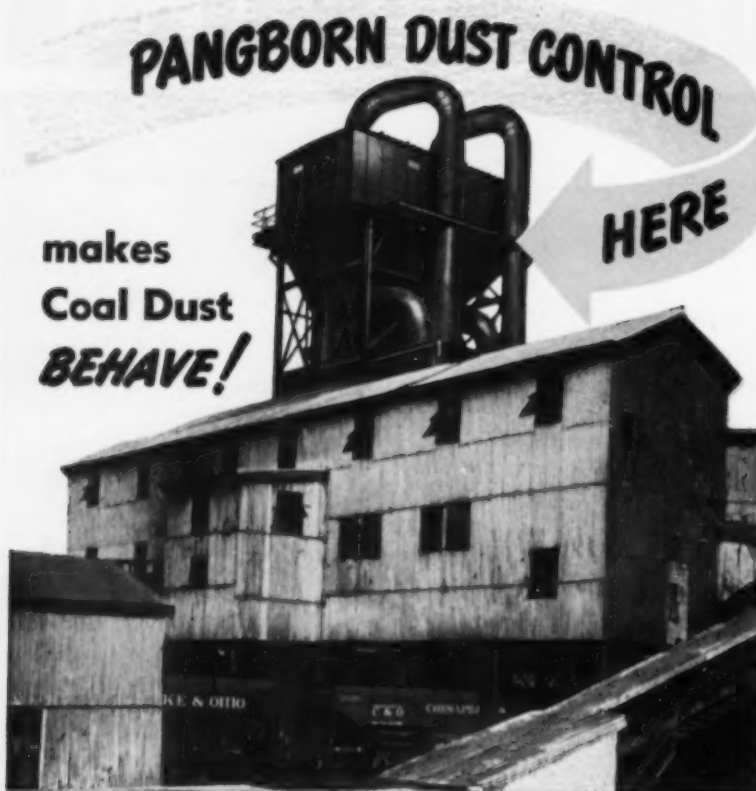
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the inception of the program, about 150 old shafts from 20 to 600 ft deep also have been filled.

"If the law requiring the sealing of abandoned mines had been passed 30 yr ago, we would not now be spending hundreds of thousands of dollars trying to control and extinguish mine fires to protect the health and welfare of our people," Mr. Maize concluded, in bringing to light another benefit of the mine sealing program.

• **In dealing with stream pollution** which results from drainage of mine acids into the waterways of the state, Mr. Morgan declared that acid drainage has permanently ruined more streams in Pennsylvania than has any other type of industrial waste. As presently written, the clean streams law in Pennsylvania applies only to clean streams, while polluted waters are not protected from further damage. In this regard, pollution means "noxious or deleterious substances rendering unclean the waters of the Commonwealth to the extent of being harmful or inimical to the public health, or to animal or aquatic life, or to the use of such waters for domestic water supply, or for industrial purposes or for recreation."

Past experience shows that unless corrective measures are applied, Mr. Morgan said, acid pollution of the streams progresses roughly in proportion to the amount of coal which has been mined. Therefore, as more new mines are opened and as older ones are extended the problem will increase unless corrective steps are taken promptly.

In estimating the damage from acids discharged to the streams, Mr. Morgan declared that the figure may approach \$3 million in 1960 in tangible losses.

• **Speaking on research** into mine drainage problems and progress, Dr. Braley showed that the production of mine acid is the equivalent of a chemical plant operated by nature on a continuous basis. The acid is the result of the reaction among sulphuric materials, oxygen and water. To lessen the formation of acid it is necessary to lessen the opportunity for these three materials to get together. In this regard, Dr. Braley suggested to strip operators that (1) pits be kept dry, (2) sulphuric spoil be segregated so that it may be buried under second-cut soil or backfilling and (3) backfilling to a point several feet above the coal and grading away from the highwall so that no pools may form. For deep mines, a study of drainage courses offers the best opportunities. It may be possible to use alkaline water from one section to neutralize acid water from another to some extent, and while this may not reduce the total amount of acid delivered, it may make for more economical pumping through the elimination of alloy pumps.

In the discussion, it was brought out that research requires monetary support and it must be continuous if beneficial results are to be achieved. Also, it was suggested that mines pumping all water in a short period of the day (offpeak) might pump to a lagoon on the surface which would feed the water to the streams over the full 24 hr. This would keep slugs of acid out of the streams.

# Double Barrel Advertising

**A**dvertising men agree — to do a complete advertising job you need the double effect of both Display Advertising and Direct Mail.

Display Advertising keeps your name before the public and builds prestige.

Direct Mail supplements your display advertising. It pin-points your message right to the executive you want to reach — the person who buys or influences the purchases.

More and more companies are constantly increasing their use of Direct Mail because

it does a job that no other form of advertising will do.

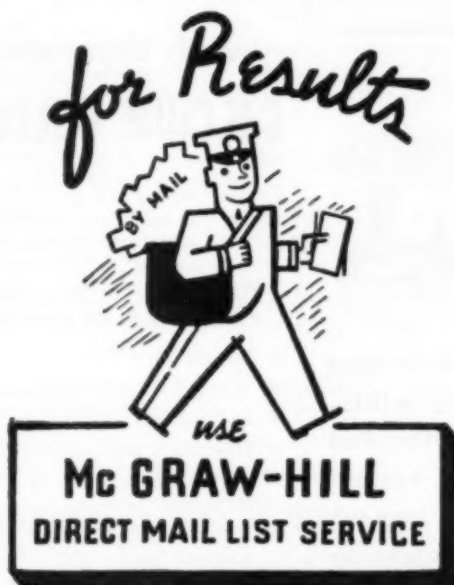
McGraw-Hill has a special Direct Mail Service that permits the use of McGraw-Hill lists for mailings. Our names give complete coverage in all the industries served by McGraw-Hill publications — gives your message the undivided personal attention of the topnotch executives in the industrial firms. They put you in direct touch with the men who make policy decisions.

Some people have a wrong conception of Direct Mail. There's no hocus-pocus to it — there's no secret formula — nor is there need for an extensive department to plan and execute your mailing program. You don't even need your own mailing lists.

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In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want.

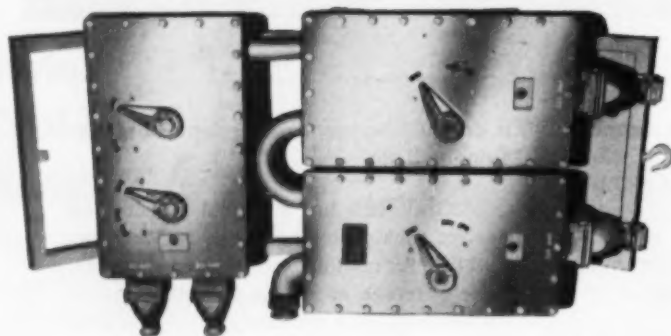
Ask for more detailed information today. You'll be surprised at the low over-all cost and the tested effectiveness of these hand-picked selections.



**McGRAW-HILL  
PUBLISHING COMPANY, INC.**

330 WEST 42nd STREET, NEW YORK 18, N. Y.

## ENSIGN PERMISSIBLE *Distribution Boxes*

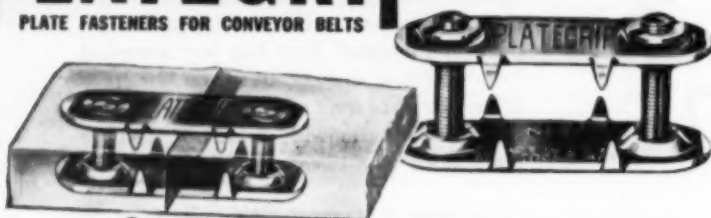


ENSIGN TYPE KK-GG, Four Circuit Permissible Distribution Box with ENSIGN Safety Lever Action Plugs and Westinghouse Adjustable Magnetic Trip Circuit Breakers, with Shunt Trip and Ground Limiters. Provides two circuits, 225 amp. capacity, for cutting and loading machine, two circuits 100 amp. capacity for drilling machine and rock duster or pump.

ENSIGN ELECTRIC & MANUFACTURING CO.  
HUNTINGTON, WEST VIRGINIA

## PLATEGRIP

PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight joints in belts of any width.

Special design spreads tension uniformly across belt, allow natural

drinking of belt and assures smooth

operation over flat, crowned or take-up

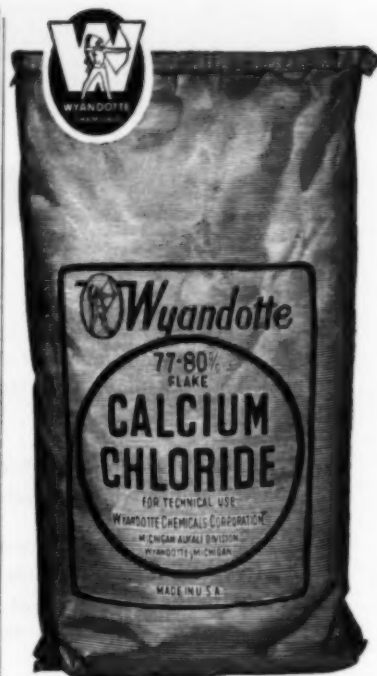
pulleys. Sizes for belts of from 1/2

to 1 1/2 inches. Write for

Catalog Sheet.



ARMSTRONG BRAY & CO.  
5340 Northwest Highway, CHICAGO 30, U. S. A.



## FREEZEPROOF COAL

with Wyandotte

## CALCIUM CHLORIDE

Prevents mining coal twice! Keeps coal unfrozen in transit and stockpiles. Satisfies dealers. Also dustproofs.

Wyandotte Calcium Chloride works for you the year around:

- De-ices
- Keeps fire barrels unfrozen
- Dehumidifies air
- Dustproofs unpaved surfaces
- Provides ballast for tractor and equipment tires
- Produces stronger, faster-setting concrete
- Keeps refrigeration brine fluid at low temperatures



WYANDOTTE CHEMICALS CORPORATION  
WYANDOTTE, MICHIGAN



## We Build Only PUMPS — The Finest of their Kind

APCO  
TURBINE-TYPE PUMPS

For the answer to any pumping problem — large or small — lasting dependability and consistent economy — may we suggest that you get acquainted with PUMPS by Aurora. They have pleased thousands. You, too, will like them.

AURORA  
CENTRIFUGAL PUMPS

PUMPS  
"by  
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**AURORA**  
*Always*  
**PUMPS**

Write TODAY  
for  
CONDENSED  
CATALOG "M"

DISTRIBUTORS IN PRINCIPAL CITIES

**AURORA**  
*Always*  
**PUMPS**

**AURORA**  
PUMP COMPANY

92 Loucks Street, Aurora, Illinois

### after you've read this magazine

... and clipped pertinent ideas, articles and advertisements for reference, please do not burn or throw it away.

Here are two sound reasons why:

- 1) Wastepaper can help to swell the funds of your local Boy Scout Troop, your church or other community organization. It gets a good price these days.
- 2) Whether in magazine form or not, wastepaper helps to fill the increasing need for paper pulp brought on by the mobilization effort.

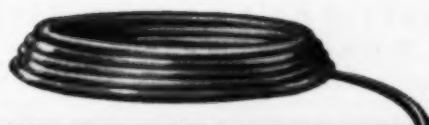
Collect it. Give it to your favorite organization. Chances are they have scheduled pickups.

## Core Drilling *by Contract*

Exploration for coal and other mineral deposits. Foundation test boring and grout hole drilling for bridges, dams and all heavy structures.

Core Drill Contractors for more than 60 years

**JOY** MANUFACTURING CO.  
Contract Core Drill Division  
MICHIGAN CITY, INDIANA



**IN MINES IT'S  
CARLON**

### BECAUSE:

This outstanding plastic pipe outlasts old-fashioned metallic pipe. By its very nature, it is completely resistant to the effects of sulphurous waters, alkalies, metallic salts and other wastes which quickly corrode metal pipe.

CARLON can be handled easily and installed fast by one man... requires minimum number of fittings. Recommended for drinking water and drainage systems, ventilating lines, hydraulic sluicing, intake and exhaust piping, etc.

Every foot of CARLON is factory-tested at greater-than-working pressures for more than 8 hours.

CARLON  
IS  
FLEXIBLE

EVERY FOOT  
IS FACTORY-  
TESTED

STRIPED FOR  
POSITIVE  
IDENTIFICATION

LENGTHS  
UP TO  
400 FEET

GUARANTEED  
AGAINST  
ROT, RUST AND  
CORROSION

SMOOTH INNER  
WALLS CUT  
FRICTION LOSS

IT'S  
LIGHTWEIGHT



WRITE TODAY  
FOR CATALOG

Buy the Pipe with the Stripe!



**CARLON PRODUCTS  
CORPORATION**

*Pioneers in Plastic Pipe*

10300 MEECH AVENUE • CLEVELAND 5, OHIO  
CANADA: Micro Plastics, Ltd., Acton, Ontario EXPORT: H. E. Butzow, New York City

## The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's

## Mine Examination Questions and Answers

3 Volumes—\$9.50, Payable in Three Easy Installments

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

### Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

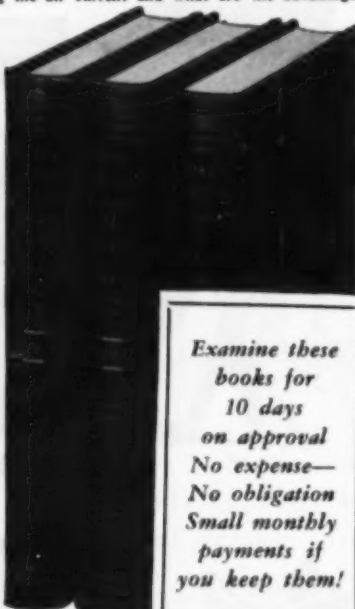
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an air pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

There are but a few of the more than 2,000 questions given in Beard's books together with full, correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can, too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



Examine these books for 10 days on approval No expense—No obligation Small monthly payments if you keep them!

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McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, 36

Send me, charges prepaid, Beard's Mine Examination Questions and Answers, 3 volumes, for 10 days' examination. If satisfactory I will pay \$9.50 at the rate of \$3.50 in ten days and \$3.00 per month. If not wanted I will return the three volumes postpaid.

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City .....

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This offer applies to U. S. only.



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- Piling • Pile Shells • Pile Fittings
- Prefabricated Piping
- SPEED-LAY System



**ALBERT pipe supply co., inc.**

BERRY AT NORTH 13TH ST. • BROOKLYN 11, N. Y.

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—anywhere

*We look into the Earth*



**PENNSYLVANIA**

**Drilling Co.**

DRILLING CONTRACTORS AND MFRS.

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## HOFFMAN BROS. DRILLING CO.

Diamond Core Drilling Contractors

PUNXSUTAWNEY PENNSYLVANIA

Tel. 382



WE HAVE SPECIALIZED IN TESTING BITUMINOUS COAL LANDS FOR OVER 40 YEARS GASOLINE • STEAM • ELECTRIC DRILLS WE PRE-GROUT SHAFT LOCATIONS HORIZONTAL DRILL HOLES FROM 3" TO 16" FOR DEWATERING MINES OUR OPERATORS ARE HIGHLY SKILLED

WE HAVE ALWAYS GUARANTEED SATISFACTORY COAL CORES We solicit your inquiries

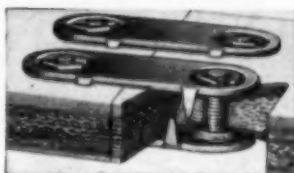
# FLEXCO<sup>®</sup>

## BELT FASTENERS and RIP PLATES



FOR HEAVY  
CONVEYOR  
AND  
ELEVATOR  
BELTS OF  
ANY WIDTH

- ★ FLEXCO Fasteners make tight butt joints of great strength and durability.
- ★ Trough naturally, operate smoothly through take-up pulleys.
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- ★ Made of Steel, Monel, Stainless, Everdur.
- ★ Also Promal top plates.
- ★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

**FLEXIBLE STEEL LACING CO.**

4638 Lexington St., Chicago 44, Ill.

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—for bringing business needs or “opportunities” to the attention of men associated in executive, management, sales and responsible technical, engineering and operating capacities with the industries served by the following McGraw-Hill publications:

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**McGraw-Hill Publishing Co., Inc.**

330 W. 42nd Street

New York 18, N. Y.



## You can't beat 'em for bits!

**Norton K-Bond CRYSTOLON\* Wheels**  
**Grind Fast...Run Cool...Last Long**

Here's the ideal grinding combination to keep your carbide-tipped drill and cutting machine bits in condition to deliver steady top tonnage.

Norton green CRYSTOLON abrasive is a special silicon carbide, with properties that assure fast, free, cool cutting — and maximum wheel life — on all carbide grinding jobs. And the new vitrified K-Bond is so closely controlled that you can get wheels of half-grade increments of hardness. This lets you “pin-point” specifications to your individual needs.

Be sure to investigate all the time- and money-saving advantages of green CRYSTOLON wheels for your carbide bit grinding.

### Your Norton Distributor Can Give You Valuable Help

Besides his own practical experience with abrasive applications in the coal mining field, your Norton Distributor can call in Norton Abrasive Engineers for additional expert aid in solving your grinding problems. Take advantage of the wide store of helpful knowledge he makes available to you. See him for the right wheels to use in any grinding job. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. Export: Norton, Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

\*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries.

**NORTON**  
**ABRASIVES**

*Making better products to make other products better*

**"she might have been my kid..."**



**T**here was no time to stop, see? She comes running out from behind this parked car right under my wheels. Her hair is in pig-tails, and with the sun shining on it, she might have been my kid. We got her to the hospital. It took 3 pints of blood to bring her around. All I have to do is remember the sound of those screaming tires—and I know

why I'm giving blood."

Yes, all kinds of people give blood—truck drivers, office workers, salesmen. And—for all kinds of reasons. But whatever your reason, this you can be sure of: Whether your blood goes to a local hospital, a combat area or for Civil Defense needs—this priceless, painless gift will some day save an American life!

#### Business Executives!

#### ✓Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed your employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a single pint of blood may mean the difference between life and death for any American . . . the need for blood is urgent!

**Give Blood Now**  
CALL YOUR RED CROSS TODAY!  
NATIONAL BLOOD PROGRAM





CLASSIFIED

**SEARCHLIGHT SECTION**

ADVERTISING

EMPLOYMENT • BUSINESS •

OPPORTUNITIES •

EQUIPMENT—USED or RESALE

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For Sale — Coal rights approx. 4000 acres Freeport seams Northern Fayette County, Penna. Write or wire S. J. Leek, Dayton, Pennsylvania.

**MINING ENGINEERS**

National manufacturer of building materials has opportunities for mining engineers to give supervision in quarry and mining operations at midwest locations. Please state age, education, experience, and salary requirement.

P 6356 COAL AGE  
520 N. Michigan Ave., Chicago 11, Ill.

**FOR SALE**

Coal Mine at Roundup, Mont. The vein of coal is 6' high, mine is in operation. Write for particulars.

John Sekulich  
107 First St. West, Roundup, Montana

**WANTED****Diesel Powered Dragline**

5 to 7 yd. capacity with 110-130 ft. boom. Advise make, age, Serial No., condition, price, approx. location.

Address P.O. Box 11, Linton, Indiana

**BUYERS OF SURPLUS COPPER INSULATED WIRES AND CABLES**

No lengths too long or too short  
Telephone: Eastgate 7-4778

PIERCE CABLE CO.  
2664 Clybourn Ave. Chicago 14, Illinois

**WANTED DRUM HOISTS**

Require several large double drum hoists, with electrical equipment. Please send all details.

W5726 COAL AGE  
68 Post St., San Francisco 4, Calif.

Roberts & Behner coal washer—3 yrs. old—100 tons per hour—washes 5" x  $\frac{1}{2}$ " row, coal & hydroclastic washer  $\frac{1}{2}$ " x 0" price is open.

Jay 8 BU & 11 BU & Myers Whiskey Loaders. GE 10 ton tandem locomotives 42 GA. Gargain. Use Steelite wetting agent for coal dust control in spray systems—add 1 gal. to 1000 gal. water, clears the air for better health & safety at low cost.  
T. L. Simpson, Machinery Agent  
1200 Woodbourne Ave., Pittsburgh 26, Pa. LEhigh 1-2254

**VARIABLE SPEED DRIVES FREQUENCY CHANGERS LOW-VOLTAGE GENERATORS**

American ELECTRIC CORPORATION  
DEPT. P, Box 133, INDIANAPOLIS, IND.

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3,000 KW,	G.E., Synch.,	250 volt DC,	13800 volt AC
1,000 KW,	A.C., Synch.,	250 volt DC,	4150 volt AC
250 KW,	C.W., Synch	250 volt DC,	220/440 volt AC
200 KW,	A.C.,	275/300 volt DC,	2300 volt AC
150 KW,	West., Synch.,	250 volt DC,	2400 volt AC
(2) 150 KW,	West., Synch.,	125 volt DC,	220/440 volt AC
(2) 125 KW,	G.E., Synch.,	250 volt DC,	2400 volt AC
100 KW,	Delco, Synch.,	250 volt DC,	2300 volt AC

**SYNCHRONOUS MOTORS**

HP	MAKE	TYPE	SPEED
475	West.	ATI	720
300	G.E.	ATI	900
200	West. (2)	ATI	900
180	G.E.	ATI	900
150	G.E.	TS-963	1200
150	G.E.	TS-9655	720

**SLIPRING MOTORS**

HP	MAKE	TYPE	SPEED
600	C.W.	131-AQ	507
500	G.E. (2)	IM	450
400	G.E.	1EM-17B	870
250	G.E.	IM-17B	450
200	G.E.	MT-559Y	1175
150	G.E.	IM	870

**250 V. D.C. MOTORS**

HP	MAKE	TYPE	SPEED
300	G.E. (3)	MPC	500
250/200	Rel.	2600T	400/800
200/130	C.W.	CMC-125H	450/900
187 1/2	G.E.	MDS-41BAR	435
150	West.	SK	1150
150	West.	SK	850
150	G.E.	LC	1750
125	Rel.	T	600

**L. J. LAND, INC.**

STONY CREEK MILLS, READING, PA.  
TELEPHONE 4-4953

**RENTAL-PURCHASE**

LIMA 802 DIESEL DRAGLINE 3 c.y., w/long & wide crawlers, 70' boom, 3 yd. bucket, completely rebuilt at cost over \$12,000. Price \$25,000 Kansas City. Will rent \$2,000/mo. apply purchase price. Our yard.

**SCREENS (located our yard)**

TYLER TY-ROCK 5' x 14' Double Deck, w/20 h.p. 220-440 motor, spray bar equipment. 90% new. \$2,850.00 Less than 1/2 new price.

ROBBINS 5' x 14' Two Deck SCALPING SCREEN. "Gyrax", w/220-440 motor, heavy duty cast pedestal mounting, adjustable for flat or low angle setting, fabricated steel top deck. Excellent \$2,750.00.

TELSMITH 5' x 12' Two Deck Screens, "Vibro-King" mdl. 90% new. \$1,750.00 each. 2 available.

**Wenzel Machinery Rental & Sales Co.**

2136 Jefferson St. Kansas City, Mo.  
Tel. Harrison 0021

Bucyrus-Monaghan Walking draglines, 1150B (25 yd.), elec., 180' boom, A-1; 9W 12-yd.; 7W, 6W, 3T, Also, Marion 7200, 6-7 yd. Marion 7 1/2-yd. elec. and 4-yd. diesel shovels. Mack 32-ton diesel trucks, 22-ton Euclids. Bucyrus 120-B 25 cycle elec. shovel, 4 1/2-yd. Marion 5480 elec. 18-yd. shovel, 95' boom. P&H 1055 diesel dragl., 110' boom, 3-yd. bkt.  
H. Y. SMITH CO.

328 N. Broadway Milwaukee 2, Wis.

**CATERPILLAR DIESEL FRONT END LOADER INTERNATIONAL DIESEL FRONT END LOADER**

Caterpillar D4 equipped with Traxcavator 1 1/4 yd. bucket. International TD9 equipped with Bucyrus Erie 1 1/4 yd. dozer shovel with interchangeable bulldozer blade. Choice for \$3150.00. Both rebuilt like new.

O. C. EVANS, Phone 195, Mt. Sterling, Ky.

**FOR SALE****Joy Equipment**

8-BU Joys  
32E15 Shuttle Car  
P115E Elevator  
T-1 Trucks

**Cutting Machines**

35B Jeffrey  
12AA, 12AB, Goodman  
Universal 50 H.P., Goodman  
7 AU Sullivan

**Locomotives**

6, 8, 10 Ton Jeffrey  
6, 10, 13 Ton G. E.

**Mine Cars**

100 All Steel, 5 Ton Capacity

All equipment listed is for 42" T. G. and 250V, D.C.

All sizes A.C. and D.C. Motors  
12 x 12 Centrifugal Recirculating Pump with 125 H.P. Motor  
Rotary Converters, 150, 200, 300 K.W.

**THE DOROTHY GORDON MINING COMPANY**

Gordon, W. Va.

Call Mine  
Office Main 5108 84-J  
Columbus, Ohio Madison, W. Va.

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### MOTOR GENERATORS

2-300 KW West. Sys. 275 V. 1200 RPM  
3-200 KW G.E. Sys. 275 V. 1200 RPM  
These are 3 phase, 60 cycle, 2350/4000 volt. complete with switchboards and full automatic AC and DC switchgear.

### ROTARY CONVERTERS

2-300 KW G.E. Sys. 275 V. 1200 RPM  
1-250 KW West. Sys. 275 V. 1200 RPM  
2-200 KW G.E. Sys. 275 V. 1200 RPM  
1-100 KW G.E. Sys. 275 V. 1200 RPM  
These are complete with switchboards, switchgear, and single phase transformers for 2300 volt.  
1-250 KW West. Mine Type Rectifier

### LOCOMOTIVES, 250 V DC, BALLBEARING

2-20-ton Jeffrey, MH-77 4-13-ton G.E. HM227  
2-15-ton West. 910-C4 2-13-ton Jeffrey MH-110  
2-15-ton West. 908-C 4-10-ton Goodman 34-B  
2-15-ton Goodman 34-A 3-8-ton G.E. HM-819 reels  
2-15-ton Jeffrey MH-110 4-8-ton G.E. HM-834 reels  
2-15-ton G.E. HM-829 3-8-ton Jeffrey MH-88  
Complete with new Jeffrey steel strip resistance. All have been rebuilt and any part showing any wear was replaced with new. Guaranteed 100 per cent against electrical and mechanical defects.

### STEEL TIPPERS AND WASHERS

1-5-Trunk Steel Tipper with Link-Belt No. 5035 Washer, 250-300 tons per hour capacity, complete with 4 large loading booms, shaker screens, vibrating screen, and all necessary appurtenances. Like new.  
1-3-Trunk Jeffrey Steel Tipper with 4 large loading booms, shaker screens, screening plant, equipped with Nordberg mesh screens, capacity 200 tons per hour; 2 shaker screens, coal cleaner, Jeffrey 36 x 36 coal crusher, motors, and all necessary appurtenances.

WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

## COAL MINE EQUIPMENT SALES COMPANY

FRANK J. WOLFE SHELDON J. WOLFE  
306-307 BEASLEY BUILDING • LONG DISTANCE PHONE 34 • TERRA HAUTE, INDIANA

### LOCOMOTIVES

5-13 ton Jeffrey MH-110, 250 D.C. 42" ga.  
1-20 ton Jeffrey MH-110, 250 D.C. 42" ga.  
3-8 ton Jeffrey MH-100 250 D.C. 42" ga.  
6-8 ton Jeffrey MH-88  
4-8 ton Manisha Battery Type 48 cell, C-61-0 mtrs 42" ga.  
8-13 ton G.E. 42" ga.  
2-8 ton Goodman 42" ga.  
3-8 ton Goodman, 42" ga.  
3-10 ton Westinghouse, 42" ga.  
6-5 ton G.E. Battery, 36" ga. (with batteries)  
5-5 ton Manisha Battery, 36" ga. (with batteries)  
3-12 ton Jeffrey, 42" ga.  
3-12 ton G.E. 42"  
6-5 ton G.E. Battery, 42"  
2-12 ton Goodman 42" ga.

### LOADING MACHINES

25-Jay Loaders, 250 D.C. 42" ga. 7 & 5 BU  
3-Jay Continuous Miners, 250 D.C.

### CUTTING MACHINES

10-Goodman Shortwall Cutting Machines

### COAL DRILLS

17-Chgo-Pneu. post mt'd coal drills, AC & DC  
50-Type 473 Derby Bros. Elec. Coal Drills

### MINE & SHUTTLE CARS

150-4 ton steel mine cars, 42" ga. E dump  
25-Jay shuttle cars, 42D  
200-3 ton 42" ga. ACP Mine cars, Timken  
200-2 1/2 ton dills  
10-Charging panels for shuttle car batteries

### GENERATORS

1-2000 KVA Westinghouse 2400 V generator, comp.  
1-1500 KW Allis Chalmers 2400 V Generator, comp.  
1-700 KVA GE  
2-100 KW Westinghouse MG set 2300 V.  
1-300 KW GE  
1-75 Westinghouse MG set

### CONVEYORS

1-36" SA Conveyor with 150 HP drive, 2000'  
6-Jay Elev. conveyors, type PL-11-22

### CAR SHAKEOUT & HOISTS

1-6 ton heavy duty L.B. car shakeout with 8 ton  
also, hoist for 225/440  
1-Hewitt-Robbins heavy duty Shakeout A.C.

### TIPPLE

1-6 track tipple comp. with shaker & boom

### MINE AND SLOPE HOISTS

3-12000 lb Wellman Sgl Drum 4"x5" F hoists with  
150 HP motors, starters, safety control, 250 V DC  
1-10000 lb Clyde DC  
1-28,000 lb Nordberg Sgl Drum  
1-11,000 lb Wellman Sgl Drum AC  
1-7,000 lb Otiswell Sgl Drum AC

### CARPULERS AND LOADERS

1-10,000 lb Link Belt Capitan Carpulter new  
1-5,000 lb Jeffrey Carpulter AC  
1-5,000 lb Link Belt Carpulter AC  
1-20,000 lb Amer. Hoist Carpulter AC  
1-20,000 lb Edison pulter

### CRUSHERS AND MISC.

1-36x30 Jeffrey Sgl Roll  
1-12x16 Eagle Dbl Roll  
1-18x10 Eagle Dbl Roll  
1-42" x 20" SA Comb. Scraper & Bucket Conveyor  
or w/o Mtr. ideal for tipple or dock.  
2-24"x30" SA Porta. conveyors AC motor  
1-(New) Nolet Porta-Feeder  
4-Jay Caterpillar T-16 Mining Machine Trucks

### HAWKINS & CO.

154 S. Michigan Ave., Chicago 3, Ill.  
Telephone Harrison 7-0725

Several other 3- and 4-track steel tipples suitable for strip, drift, slope or shaft mines.

### LOADING MACHINES, 250 V DC

6-14-BU-SPE Joy 5-400 Goodman  
4-14-BU-7RBE Joy 2-300 Goodman  
6-11-BU Joy 4-200 Goodman  
6-8-BU Joy 5-L-600 Jeffrey  
10-7-BU Joy 2-L-500 Jeffrey  
2-Myers-Whaley No. 3 Automats, practically new.

### AC CUTTING MACHINES — 220/440 V

2-Jeffrey 28-U 5-Goodman 12G3  
1-Jeffrey 24-B 3-Goodman 112G3  
3-Jeffrey 35-BB 4-Goodman 112G3A  
1-Jeffrey 35-L 2-Goodman 112D3A

### PERMISSIBLE TYPE, 250 V DC

6-Jeffrey 28-U on rubber 6-Gullivan 7-B on cats  
tires 6-Goodman 512 on cats  
3-Jeffrey 29-U cat 6-Goodman 324-AA track  
mounted 4-Goodman 324-AA on  
4-Jeffrey 29-U track 4-Goodman 324-BJ track  
mounted 2-Goodman 424-BJ track  
10-Jeffrey 35-BB mounted  
4-Jeffrey 35-BB

### ELECTRIC HOISTS

All types of Hoists from 100 HP to 1200 HP suitable for slope, shaft or drift mines.

### STEEL MINE CARS

Several lots of Rotary Dump, End Dump, and Drop Bottom Mine Cars for high and low vein mines. Mail us your inquiries. We have them in lots from 100 to 600; track gauges 36" - 40" - 42" - 44".

ALL TYPES OF CABLE REEL SHUTTLE CARS, 250 V DC

## SUPERIOR DIESEL GENERATOR SETS

100 KW

30 sets available. ENGINE:  
8 cylinder, 150 H.P.—5½ x 7.  
GENERATOR: 120/240 volts  
D.C., 417 amps., stabilized  
shunt, electric starting.

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## LOCOMOTIVES

1½ to 10 Tons 15" to 54" Track Gauge.  
GREENSBURG MACHINE CO.  
Greensburg, Pa.

### SPECIAL OFFER

## 300 KW Ridgway Motor Generator Set

275V. 1090 Amps. 1200 Rev. 2300V. 3 ph. 60 cy.  
with A.C. & D.C. Switchboards.

ALL COMPLETELY REBUILT  
MOORHEAD ELECTRICAL MACHINERY CO.  
P.O. Box 7991C Pittsburgh 16, Pa.

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## New 500 Gal. Skid Mounted STORAGE TANKS

Shell of 1½" Steel, 2" Outlet and 12" Manhole in Top.

LEFTON INDUSTRIAL CORP.  
212 Victor Street, St. Louis (4) Mo.

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## GUARANTEED A-1 RECONDITIONED COAL MINING EQUIPMENT

Goodman 360 Loaders  
Goodman G20B77 Shaker Conveyors  
Sullivan 7AU Cutting Machines  
CPT574 Post Mounted Drills

New spare parts for all of the above equipment at substantial savings.

## KAISER STEEL CORPORATION SUNNYSIDE, UTAH

### WORLD'S LARGEST INVENTORY

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SWITCH MATERIAL ALL TRACK ACCESSORIES

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We have recently purchased several complete coal plants and have available an excellent stock of all types of machinery. Below is just a partial listing of our complete stock of mining, electrical and industrial equipment.



### LOCOMOTIVES

- 1—2 ton Whitcomb, battery, 24" ga.
- 1—4 ton Mancha, battery, 24" ga., with Edison batteries and charging set
- 1—4 ton Iron-ton, battery, 36" ga.
- 2—7 ton G. E. permissible battery, 36" ga.
- 1—7 ton Atlas, battery, 36" ga.
- 3—8 ton Iron-ton, 36" ga.
- 2—8 ton General Electric, battery 36" ga.
- 4—10 ton Atlas, battery, 36" ga.
- 1—3 ton Whitcomb gas engine driven, 24" ga.
- 1—2½ ton Jeffrey trolley, 36" ga.
- 1—4½ ton Goodman trolley, 36" ga.
- 1—5 ton Jeffrey trolley, 36" ga.
- 1—6 ton Goodman trolley, 36" ga.
- 2—8 ton Goodman trolley, 36" ga.

### COAL CRUSHERS

- 1—24" x 24" Jeffrey Single Roll
- 1—24" x 36" McNally-Pittsburg Double Roll
- 1—30" x 45" Jeffrey Single Roll
- 1—30" x 16" Williams Pulverizer
- 1—36" x 40" Jeffrey Double Roll
- 1—36" x 48" Jeffrey Hammermill

### TUGGER & SLUSHER HOISTS

- 2—5 HP Brownie Room Hoists
- 3—5 HP Sullivan RH single drum Room Hoists
- 1—7½ HP Sullivan double drum Slusher Hoist
- 2—10 HP Sullivan 3 drum Slusher Hoist
- 1—25 HP Sullivan 2 drum Slusher Hoist
- 1—Ingersoll-Rand Model 1H Air Tugger Hoist
- 1—Ingersoll-Rand Mod. 6HC Air Tugger Hoist
- 1—Ingersoll-Rand Model EU Air Tugger Hoist
- 2—6½ HP Sullivan Single Drum Air Tugger Hoist, 250 Volt DC
- 7—6½ HP Sullivan Double Drum Slusher Hoist, 250 Volt DC
- 1—Double Drum Sullivan Slusher Hoist Driven by Continental Gasoline Engine

### ELECTRIC HOISTS

- 1—11 HP Vulcan #0 single drum
- 1—20 HP Vulcan single drum
- 1—22 HP Vulcan double drum
- 1—25 HP Vulcan single drum
- 1—30 HP Vulcan single drum
- 1—37 HP single drum
- 5—50 HP single drum
- 2—60 HP single drum
- 4—100 HP Box single drum
- 1—112 HP Vulcan single drum
- 1—145 HP Vulcan single drum
- 2—150 HP Vulcan single drum
- 1—375 HP Box single drum
- 1—600 HP Box single drum

### BOX CAR LOADERS

- 2—Ottumwa 20 HP Box car loaders
- 3—Maniere 22 HP Box car loaders
- 1—Jeffrey 20 HP Box car loader

### MINING MACHINES

- 2—7B Sullivan super short wall coal cutters
- 18—CE7 Sullivan coal cutters
- 1—CR3 Sullivan coal cutter
- 1—Jeffrey 28A coal cutter
- 6—Goodman 112-A coal cutters
- 1—Sullivan CH-11 ironclad shearing machine
- 1—Jeffrey 29-C Arcwall coal cutter

### LOADERS & CONVEYORS

- 2—8BU Joy loaders
- 2—61EW Jeffrey elevating chain conveyors
- 1—61HG Jeffrey chain conveyor, 90'
- 1—61W Jeffrey chain conveyor, 200'
- 9—C-20 Goodman shaker conveyors
- 10—G-15 Goodman shaker conveyors
- 8—Vulcan shaker conveyors
- 2—Joy ladel UN-17 shaker conveyors
- 10—Goodman HA duckbills

### MINE FANS & BLOWERS

- 2—8-H Jeffrey 42" Aerodyne Fans
- 1—Jeffrey 8 x 4 Fan
- 5—Jeffrey A61 exhaust blowers
- 8—Jeffrey Aerodyne midjet blowers

### SCALES

- 3—100 ton Fairbanks railroad scales
- 1—100 ton Howe railroad scale
- 1—125 ton Howe railroad scale
- 1—5000# Fairbanks Tipple scale with weighing basket
- 1—5000# Howe Tipple scale

### STORAGE BINS

- 3—50 ton capacity steel bins
- 2—100 ton capacity steel bins

### TIPPLE EQUIPMENT

- 1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
- 1—4 deck card shaker screen, 18' long, driven by 50 HP motor
- 1—Card rotary car dumper
- 1—Link Belt, bucket elevator, 50' centers, 18" x 10" x 9" buckets

- 1—Link Belt bucket elevator, 50' centers, 10" x 6" x 6" buckets
- 1—Link Belt bucket elevator, 60' centers, 6" x 4" x 4" buckets
- 1—Jeffrey picking table, 19' centers, 36" wide
- 1—Jeffrey picking table, 19'8", 36" wide
- 1—Jeffrey Drag Conveyor, 88'6", 36" flights
- 1—Jeffrey Drag Conveyor, 72', 30" flights
- 1—Jeffrey Drag Conveyor, 67', 30" flights
- 1—Jeffrey Drag Conveyor, 69'6", 28" flights
- 1—Link Belt Drag Conveyor, 50', 15" flights
- 1—32" x 9'6" Card vibrating screen
- 1—4' x 6'6" Link Belt jig washer
- 1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
- 1—Loading boom, 55' centers, 48" flights
- 1—Loading boom, 45' centers, 30" flights
- 2—Card self dumping mine cages
- 2—Card 84" bicycle sheave wheels
- 1—24" Belt conveyor, 40' centers
- 1—24" Belt conveyor, 13' centers
- 1—24" Belt conveyor, 135' centers
- 1—24" Belt conveyor, 66' centers
- 1—30" Belt conveyor, 173' centers
- 1—Red Devil egg loader, 16" flights
- 1—Ottumwa nut loader, 16" belt

### ELECTRIC CABLE

- 1368'—#10 Parkway cable 3/c, 7200 volt
- 2977'—#8 Parkway cable 3/c, 7200 volt
- 262'—#8 Parkway cable 3/c, 600 volt
- 1900'—#6 Parkway cable, 3/c, 7200 volt
- 970'—#2 Parkway cable, 600 volt
- 2,098'—#6 Torex cable, 600 volt, 3/c
- 1417'—#4 Torex cable, 3/c, 600 volt
- 547'—#2 Torex cable, 3/c, 600 volt
- 1022'—#12 new Torex cable, 4/c, 600 volt
- 5250'—#300,000 CM stranded w.p. 1/c
- 14122'—#1/0 stranded r.c., 1/c
- 16682'—#4 stranded r.c., 1/c
- 2300'—#4/0 stranded r.c., 1/c
- 1705'—#4 solid bare
- 5467'—#2 solid bare
- 2600'—#1 solid bare
- 1255'—#1/0 solid bare
- 2975'—type TTHFA-60 new telephone cable

### PIT CARS

- 160—60 cu. ft. coal mine cars, wooden sides, 42" ga.
- 125—60 cu. ft. Card steel coal mine cars, 36" ga.
- 88—66 cu. ft. Card steel coal mine cars, 36" ga.

### SHUTTLE CARS

- 2—Joy Shuttle Cars, Model 42D5.

### RAIL

- 16, 20, 30, 40, 52, 60, and 80# relaying rail in stock

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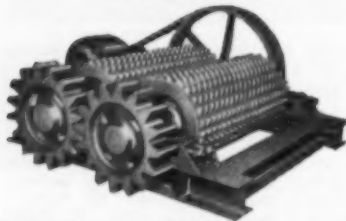
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Coal crushers to 250 tons per hour capacity ..... From \$479.00  
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Heavy duty eccentric-shaft types; 1 to 5 decks, 2'x8' to 5'x14'. Others from 2'x4'. Wire cloth or plate included to your specifications.  
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Complete with motor and drive. 15 to 225 tons per hour capacity. Priced from ..... \$423.00

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3-roll Troughing Idlers for these sizes:  
14" belt ..... \$16.50 24" belt ..... \$18.75  
18" belt ..... 17.25 30" belt ..... 19.50  
18" belt ..... 18.00 36" belt ..... 20.25  
42" belt ..... \$21.00

1-roll Return Idlers for these sizes:  
14" belt ..... \$ 6.38 30" belt ..... \$ 8.25  
18" belt ..... 6.75 36" belt ..... 8.75  
24" belt ..... 7.50 42" belt ..... 9.50  
48" belt ..... \$10.25

All welded steel head and takeup tail sections in stock. Complete assemblies including bearings, shaft and frame. Also a wide variety of famous brands of conveyor belt from 18" to 48" wide carried in stock.

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400 KW West. 550 v. 720R-Syn.-BK 2300/4000 v.  
2-300 KW West. 275 v. 1200R-Syn. 2300 v.  
300 KW G.E. 275 v. 1200R-MPC-AT1 2300/4000 v.  
300 KW Rldg. 275 v. 1200R-Syn. 2300 v.  
300 KW West. 550 v. 1200R-Syn.-BK 2300 v.  
200 KW West. 275 v. 1200R-SG-CW 2300 v.  
200 KW G.E. 275 v. 1200-MPC-AT1 2300/4000 v.  
200 KW Rldg. 275 v. 900R-Syn. 2300 v.  
200 KW West. 275 v. 900 R. BK-Syn. 2300 v.  
200 KW G.E. 125 v. 1200 R. MPC-AT1 2300/4000 v.  
150 KW G.E. 275 v. 1200 R. MPC-AT1 2300/4000 v.  
150 KW West. 275 v. 1200R-Syn.-BK 2300 v.  
150 KW G.E. 550 v. 900 R-DLG-AT1 2300/4000 v.  
100 KW Rldg. 275 v. 1200R-Syn. 2300 v.  
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.  
15 KW Ideal 125 v. 1700R. D-A 220/440 v.

### LOCOMOTIVES AND CUTTING MACHINES

20 Ton Jeff 250 v. 44" Ga. MH77  
13 Ton Jeff 250 v. 38/48" Ga. MH110  
18 Ton Jeff 250 v. 36/48" MH110  
8 Ton Goodman 250/550 v. 42"/44" ga.  
6/7 Ton Jeffrey Battery 42" ga.  
6 Ton Westing. 250 v. 36" Ga. 904  
2-6 Ton G.E. 250 v. 28 1/2" ga.  
4-5 Ton Goodman 300 250 v. 42"/44"  
35 B Jeff. 250 v. Permissible  
35 BB Jeff. A.C. permissible  
3-12A Goodman Shortwall 50HP Motor 250 v.

### ROTARY CONVERTERS

2-500 KW G.E. 275 v. HCCS-1200R. 13,280 v.  
400 KW West 275 v. 1200R. 13,560/2300/4000  
300 KW G.E. 275 v. HCCS-1200R. 2300/4000 v.  
300 KW G.E. 275 v. HCCS-1200R. 2200/4000 v.  
250 KW G.E. 275 v. HCCS-1200R. 2200/4000 v.  
150 KW G.E. 275 v. HCCS-1200R. 2300/4000 v.  
Will rewind transformers to your specifications.

### AC MOTORS

HP	MAKE	SPEED	TYPE	WDB.
400	G.E.	450	IM	S.R.
300	G.E.	450	MT	S.R.
150	G.E.	600	ATI	Syn.
2-100	G.E.	450	IM	S.R.
100	West.	1200	CB	Syn.
75	West.	900	CB	S.G.
50	G.E.	1750	KT	S.G.
50	G.E.	900	KT	S.C.
40	G.E.	900	MT	S.R.
30	G.E.	900	KT	S.C.
30	G.E.	1200	KT	S.C.
20	West.	1200	CB	S.C.
15	West.	1750	CB	S.C.

Many smaller units in stock.

Also 230 V. DC Motors Rated 200-125-75-60-30-10 HP.

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30 INCH 1-136' — 1-270' — 2-350' —  
1-418' — 2-500' — 1-1100' &  
2-1500' Long.  
36 INCH 1-160' — 2-250' — 1-320' —  
1-400' — 1-590' — 2-1000' &  
1-1600' Long.  
42 INCH 1-144' — 1-290' — 1-377' —  
1-575' — 2-700' — 1-800' —  
2-1500' Long.  
Extra Idlers—Terminals—Belts  
STEEL STORAGE TANKS  
26—8,000-10,000 & 20,000 Gal. Cap.  
LOCOMOTIVES  
20 TON WHITCOMB GASOLINE  
65 TON G.E. DIESEL ELECTRIC  
2-100 TON G.E. DIESEL ELEC.  
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guaranteed excellent condition, 48 ft. boom, 34 ft. sticks, 3 3/4 yd. bucket, large inventory of parts.  
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400 ton Chambersburg Hyd. Wheel Press, motor drive.  
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### Complete Coal Washer

Engineered by Roberts & Schaefer Company to wash 5" to 0", 112 ton per hour, can be moved.

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2000 ft. Centers, 40 H. P., 230 Volt, D. C.—New or used Belting

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### Gas Generating Unit

500,000 cu. ft. Holder 3 Blast & 2 Gas Blowers  
5 Gas Generators Automatic Controls  
5 Igniters, 10 Ash Cars Lubricators, Pumps  
5 Washboxes Scrubbers, Etc.  
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## FOR SALE

1-Jeffrey Aerodyne Exhaust Fan, Type S-H-80  
Serial 78636, complete with 75HP Waco motor and 75HP Gasoline engine w/ automatic control.  
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Serial 1-24P225, 3 car.  
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SAFETY, AIR,  
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**TOUGH COVERS**—heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.

**STRONG CARCASS**—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.

**FLEXIBILITY**—Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily run true on all idlers, gauge resistant, excellent for long and short hauls and slope installations.



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We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness		Type of Carcass
		Top Cover	Bottom Cover	
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
22"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
28"	5	1/8"	1/32"	28 Oz.
30"	5	1/8"	1/16"	32 Oz.
32"	6	1/8"	1/16"	32 Oz.
34"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
38"	5	1/8"	1/16"	32 Oz.
40"	5	1/8"	1/16"	32 Oz.
42"	8	1/8"	1/16"	32 Oz.
44"	8	1/8"	1/16"	32 Oz.
46"	8	1/8"	1/16"	32 Oz.
48"	8	1/8"	1/16"	32 Oz.

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New and used.  
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2—1,250 Ft. Pcs. 1-5/8" Roebbing Locked Smooth Coil Track Strand Wire Rope for Aerial Tramway. NEW—NEVER USED. Apply to THE SNAP CREEK COAL COMPANY, P.O. Box No. 1029, or Tel. 1533, Logan, West Virginia.

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Sullivan 11-B and 7-B, latest types.  
Goodman 212AA, 112AA, 12AA  
Jeffrey 35-L, 35-B, 29-C, 29-B, 29-L.  
Shortwall, Arcwall & Slobbers.

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3 Conductor 2/0, 6000 Volt Cable.  
4/0, 6/0, 9 section, 500,000 CM, 750,000 CM, 350,000 CM and 4/0 stranded. Other sizes also.

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1 Joy low pedestal 14 BU Loader.  
1 Jeffrey 61 CLR Loader.  
2 Myers Whaley No. 3 Automat Loaders.  
1 Joy cable reel Shuttle Cars.  
1 Joy T-2 low pon Cat Truck.  
5 Joy T-1 Caterpillar Machine Trucks.  
6 Joy Lodel Shaker Conveyors.  
2 Joy Belt Feeders, PL-12.  
5 Jeffrey 61 AM, 12" Room Conveyors, 300'.  
1 Jay 30" Underground Belt Conveyor, 300'.  
2 Goodman 97-C, 30" Belt Head & Tail Pieces.  
3 Barber-Greene 24" x 50" portable belt Conveyors.  
1 Quickway Truck Shovel.  
1 Insley Crawler Shovel.

### LOCOMOTIVES (all track gauges)

3 Jeffrey MH-78, 10 ton Locomotives, 2 in tandem.  
12 Jeffrey MH-88, 6 ton Locomotives, 3 pr. in tandem.  
(large stock of parts & supplies for above)  
2 Goodman, 8 ton, 28" above rail.  
6 Goodman, 6 ton, armor plate frames.  
3 Westinghouse 904, 6 ton, bar steel frames.  
(Most of the above have motor driven reels)  
1 Gas 4 ton—2 Diesels 16 & 20 ton.

### MINE CARS

80 End Dump, 48" Ga., 30" above rail.  
30 End Dump, 48" Ga., 20" above rail, all steel.  
25 Drop Bottom, 44" Ga., 24" above rail.  
20 End Dump, 42" Ga. 30" above rail.

### MISCELLANEOUS

6—8,000 Gal. Tank Car Tanks.  
5000 Five Gallon G. l. gas and water cans.  
1 Brown Fayro Car Spotting Hoist.  
1 Joy CHD Car Spotter (new).  
Relaying Rails, 400 tons, 20, 30, 40, 70 and 80#. Steel Mine Ties, 42", 44" and 48" Ga., 20#, 30#, 40# and 60#. Coal Crushers Wilmot & Pittsburgh.  
1 Truck Tipple 3 track, complete with coal washer, side tracks, truck scales, real estate. Vibrators, all sizes.  
Loading Booms, Belt and Chain & Flight. Coal Drills, CP-572, AC and DC. Jeffrey A-6 Post Drills.  
New Alemite portable Greasing Unit.  
Incline Hoists, Aerial Tram.  
Drill Press, Lathes, Planers Shear, Etc. Stationary Motors, AC & DC. All sizes. Spare Armatures of all kinds.  
Mine Scales, Pipe Threading Machines.  
New Westinghouse Tandem Hydraulic control Assembly for 6 to 10 ton Locomotives.

### POWER PLANTS

1 GMC Diesel, 75 KW, 275 Volts.  
2 Superior Diesels 100 KW, 275 V.  
1 Motor Generator, 150-KW, 275 V.  
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### FOUR BRAND NEW JOY MACHINES IN STORAGE

1—10 RU Cutting Machine  
1—14 BU Loader  
2—10 SC Shuttle Cars  
1—500 KW Westinghouse MG Set, Syn., AC2300, DC275, 1200 RPM. Complete with Switch Board.  
2—150 KW General Electric MG Sets, Syn., AC2300, DC275, 1200 RPM. Complete with Switch Board and Automatic Circuit Breaker.  
1—Ottumwa Hoist, 8" Conical Drum, 1 1/8" Rope, 300 HP Slip Ring Motor, 450' Shaft.  
1—Smaller Hoist, 20-24" Double Drum, 80 HP Heavy Duty Reversible SP Westinghouse Motor, 220V  
1—500' Chain Conveyor, 15", used very little with motor.  
Four rolls 500 Circular Mills Covered Cable. One roll 1000 Circular Mills bare cable. One Roll 3 strand .04 Rubber Covered Cable.  
Have ideal location for Slope Mine. Large Acreage, 160' Deep, 6' Coal (14,000 BTU). No Water, Sand, or gravel. Good Top. Would sell equipment and lease land to responsible parties.

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Owner

## FOR SALE

2—Model UD24 Diesel Power Units, Serial No. 628 and 636, 1200 RPM with International Engine, Century Generator.  
1—All metal conveyor, complete with head and tail piece. Approx. 52" x 70'. Used.  
1—Caterpillar Light Plant, skid mounted, Model D4600, 110 volt, good condition.

**Freeport Gas Coal Co.**  
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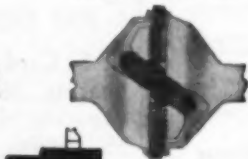
You get extra-wide gathering range—5" axial displacement or 60° angularity, *horizontally*; 2½" displacement or 18° angularity, *vertically*. Locks grip tightly—prevent slack and costly wear. You can rotary-dump *without* uncoupling; unlock from either side. Get the utmost in safety and savings now! *Standardize on American Automatic Mine Car Couplers.*

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Any two heads couple—and they're always ready to couple, because locks pivot freely in uncoupled heads. Movement of lock-control bar remains unrestricted until flanges of two heads come together.

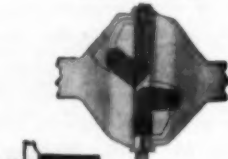
#### HOW AMERICAN COUPLERS LOCK



#### WON'T "CREEP"

As pivoted locks swing into engagement, each control bar drops to lock against the flange of opposite head.

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Lifting and pulling either control bar unlocks the coupler and holds lock in lock-set position until heads move apart.

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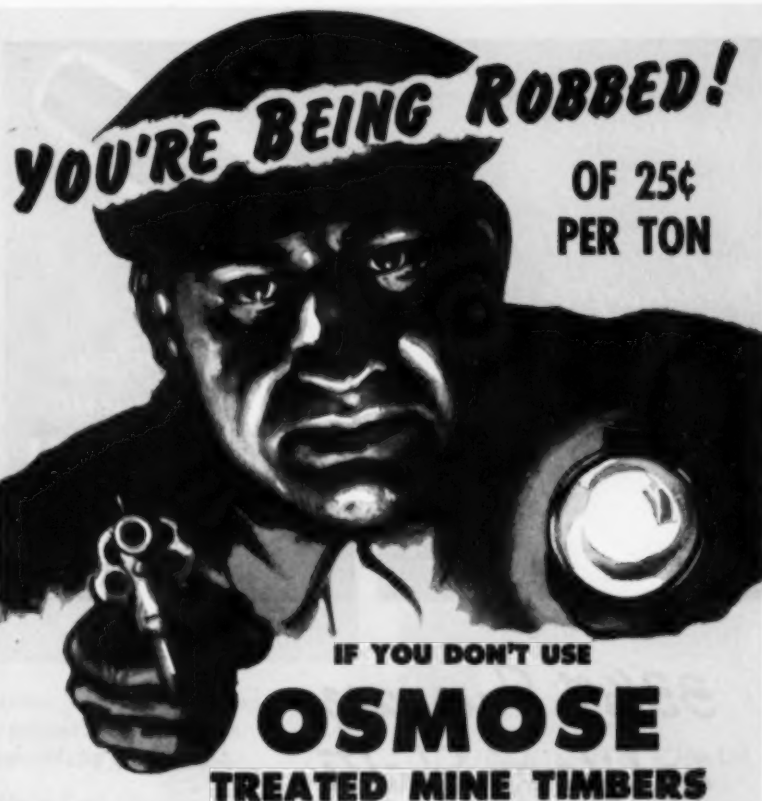
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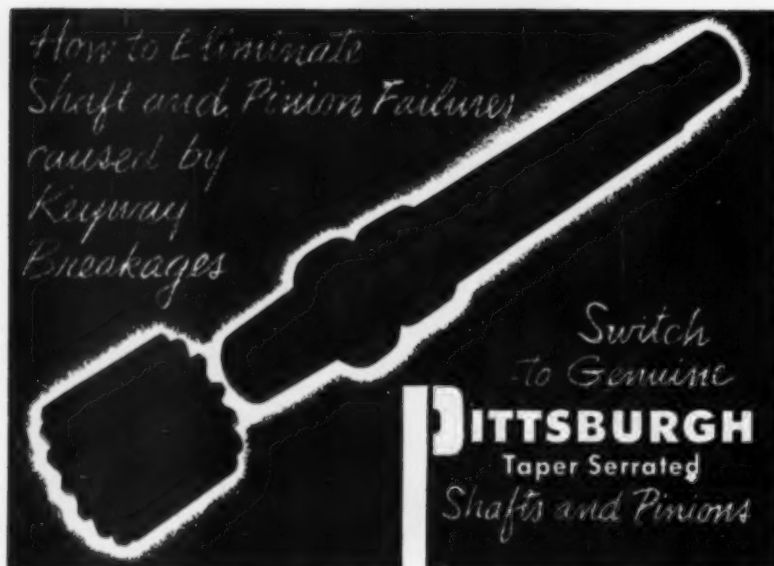
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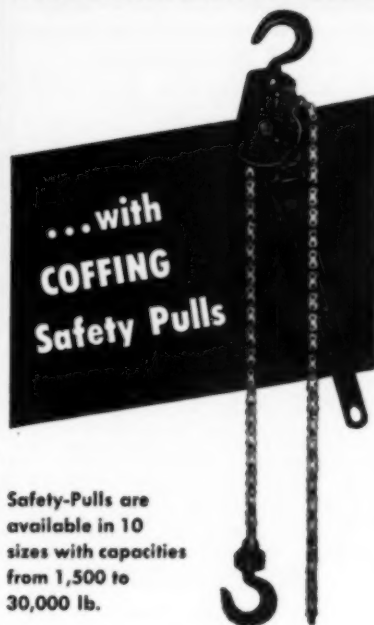
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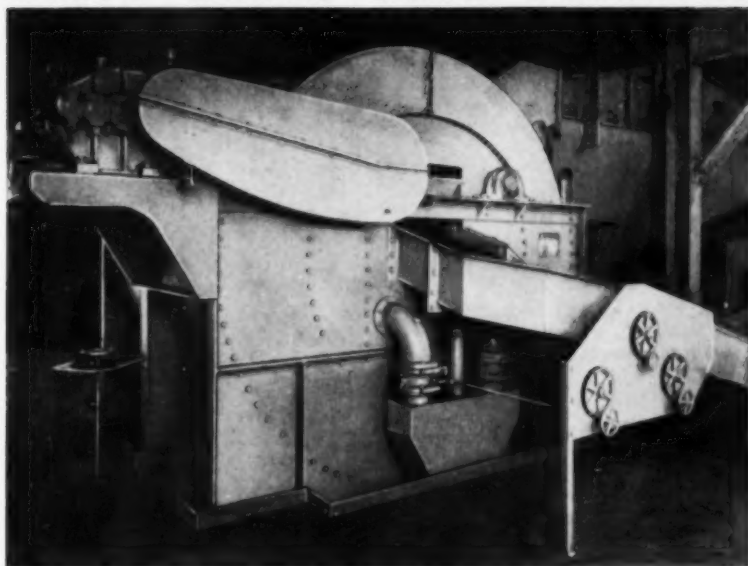
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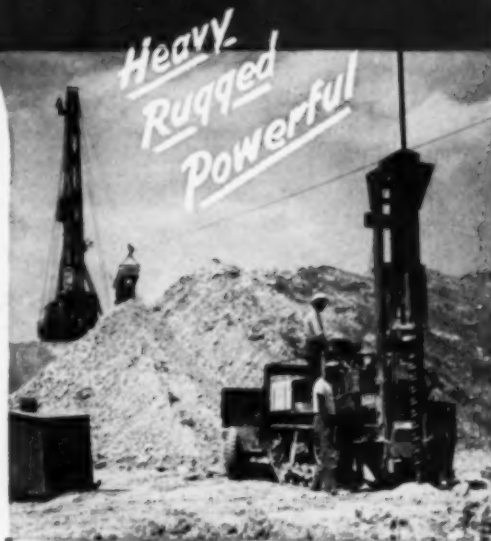
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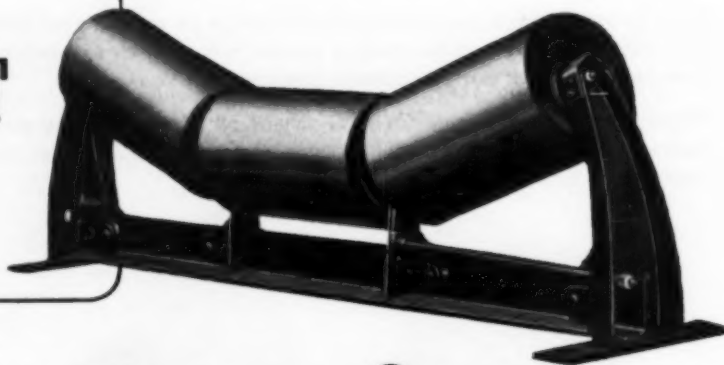
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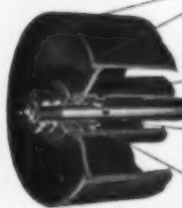
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\* Indicates that detailed information may be found in the 1951-1952 MINING CATALOGS.

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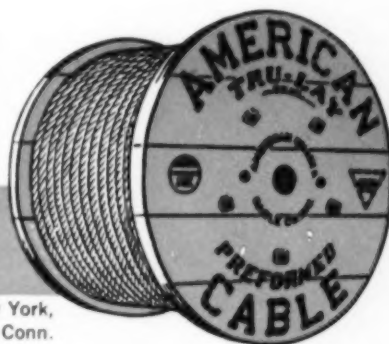
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# Get cleaner, more uniform coal ... at greater capacities!

Pick the right LINK-BELT coal washer to match your coal seam and your markets

LINK-BELT manufactures three coal cleaners . . . and all three remove foreign matter from coal with top efficiency, effectively separate slate, rock, bone.

Each cleaner is designed for a different set of requirements . . . the result of over 60 years of Link-Belt specialization in coal preparation. Our engineers will be glad to work with you and your consultants . . . help you get the washing equipment that best meets your needs.

## FOR CONTROLLED, ECONOMICAL WASHING

**Air-Pulsated Washer** — Extremely flexible for high-capacity cleaning of sized and unsized coal. Compressed air allows graduated pulsations in different compartments—immediate removal of heavy refuse . . . sharp separation of lighter refuse and bone from coal. One-man operated and easily adjustable while running. Suitable for a wide range of coal characteristics and sizes.

## FOR LARGE VOLUME AT LOW COST

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## FOR DIFFICULT WASHING JOBS

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